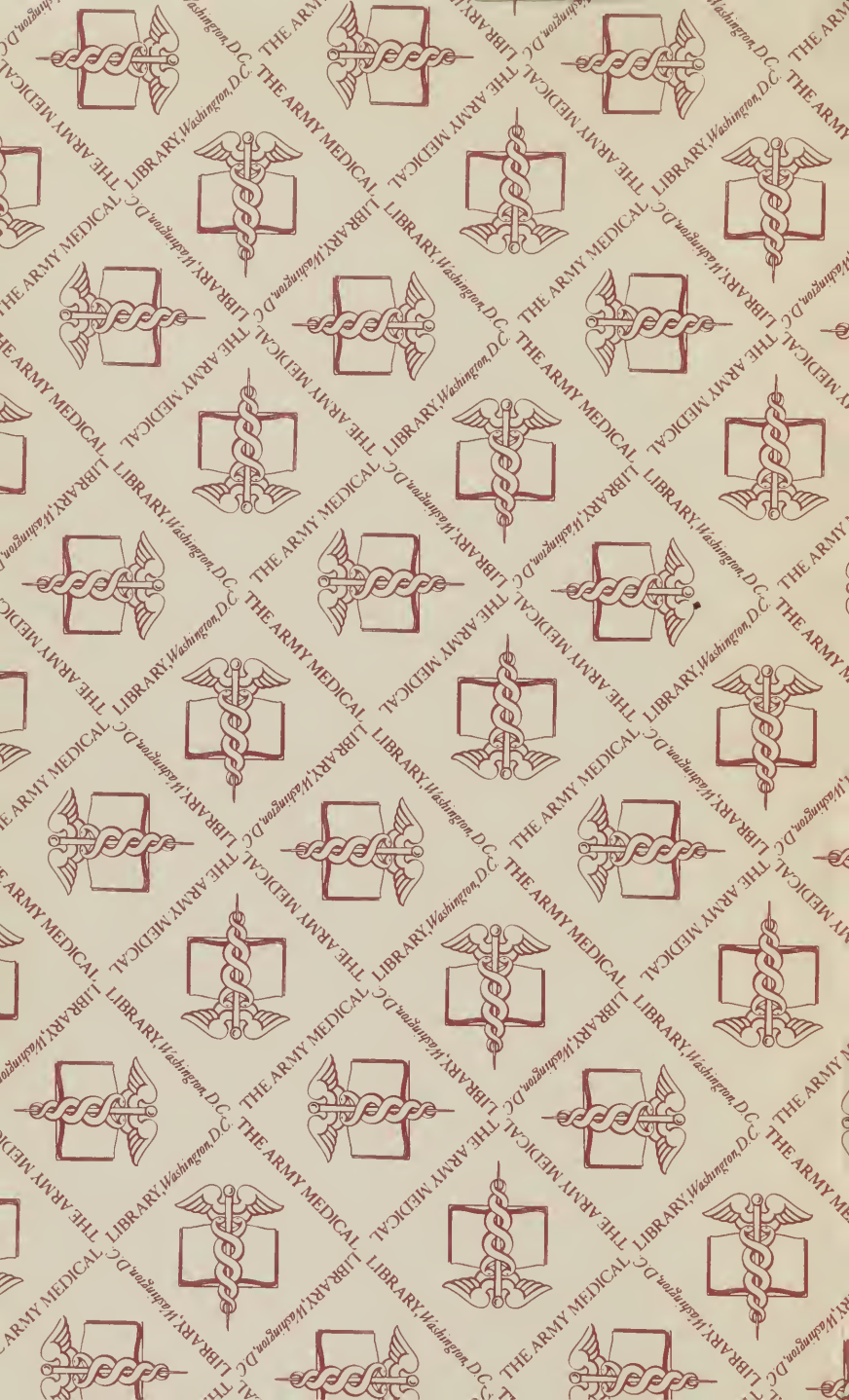
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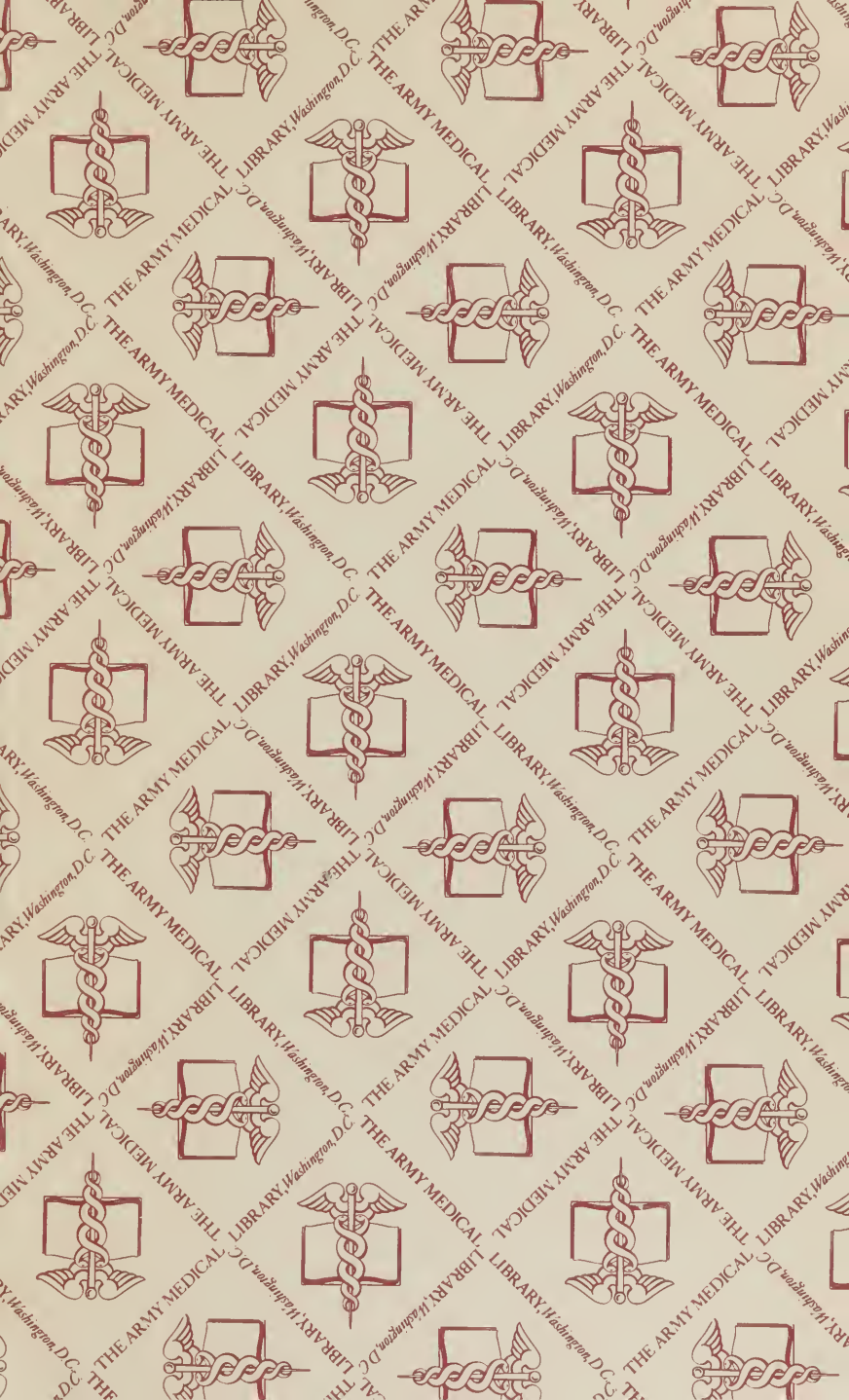
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THE OUTLINES

OF

GENERAL PATHOLOGY.

...MEDICAL COLLEGE

BY

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TO

JOHN H. POLIN, M. D.,

OF SPRINGFIELD, KENTUCKY,

AS A TRIBUTE OF RESPECT FOR HIS ATTAINMENTS AS A SCHOLAR AND PHYSICIAN, AND HIS VIRTUES AND MANY AMIABLE TRAITS AS A CITIZEN, AND AS A MAN, THIS ESSAY IS INSCRIBED, BY HIS FRIEND AND FORMER PUPIL,

THE AUTHOR.

PREFACE.

The following chapters, with the exception of the last two, have appeared at intervals under the title of "Medical Essays," in the St. Louis Medical and Surgical Journal. When the author concluded to publish them in the present form it was his intention to make considerable additions to them and some changes, not, however, affecting the principles therein advocated. He has not had the leisure to do this — nor even to superintend the correcting of the proof-sheets, for which he is indebted to his friend and pupil, Mr. Lonergan.

The critic may, perhaps, justly find fault with the style which pervades many of the chapters. The author would have modified it but for the reason just given. The critic may find fault with the doctrines advocated — the author has seen no reason to change or modify them, and he is disposed rather to court than to shun the ordeal of impartial criticism.

CONTENTS.

CHAPTER I.

GENERAL CONSIDERATIONS—DEFINITION OF DISEASE.

Man, in contemplating himself, or the external world, finds his faculties bounded by infinitudes.

In every direction he can proceed a certain distance, but his powers, like the waves of the ocean, have their limits, and the inexorable decree, binding alike on the one and the other, is, "thus far shalt thou go, and no further!"

When, aided by the microscope, he endeavors to reach the ultimate atom and deathless monad, he perceives, it is true, objects inconceivably small, and far removed from the regions of natural vision; but these enlarge with magnifiers of a higher power, and even fancy is bewildered in attempting to detect, in the microscopic abyss, the ultimate division of matter. If, armed with the telescope, he gazes into the ample regions of space, he finds bodies of almost inconceivable magnitude, and the imagination fails to measure their possible hugeness. The smallest and the largest spaces are alike as far beyond human conception as the beginning and termi-

nation of duration. Each end of the vast chain of causes and effects reaches beyond the points at which philosophy is arrested in her march.

Within these limits, however, the mind finds ample room for exercise. It is confined to no "*pent-up-Utica.*" It is capable of investigating its own properties, and those of the material world with which it is associated, and in no inconsiderable degree. It can unravel the mystic woof of nature to an astonishing and highly utilitarian extent.

Of all the studies which can engage it, few can compare, in importance or in difficulty, with that of man himself, in all his various relations. As a physical being, he is but a fraction of matter, and subject to its laws.

The material universe, of which he constitutes a very small portion, is endowed with properties, or laws, which bind its atoms and its orbs into one intimately connected and stupendous system.

It is in virtue of these properties, that the planets circle the sun and revolve on their axis, with fixed and unfailing regularity and precision, and that other suns and their satellites hold their stations, or make their circuits in illimitable space. It is in virtue of these properties, that comets, those "*wandering stars*," which would seem to acknowledge no restraint, to know no law, return, at regular periods, from those far-off regions, whither even fancy can scarcely follow them, or where, confused and astounded, she pictures the suburbs of creation and the barriers of space.

It is in virtue of these properties, that atoms, as well

as worlds, influence each other — that the acid and alkali unite — that the solid metal is corroded by the invisible oxygen — that the smoke ascends, the rain falls — that the air fans the fevered brow, with the soft murmur of the zephyr, or spreads havoc in its march with the fearful voice of the storm — that the plant silently steals from it its carbon, and the animal appropriates its oxygen — that the sap rises to the tender leaves — that the pulse beats — the muscles contract — the tissues are nourished for a time, and return to the earth from which they came, to undergo other and ever-varying metamorphoses. It is not important, so far as the study of matter is concerned, whether we regard its laws or properties as *eternally and necessarily* connected with and dependent on it, or as having been impressed on it, at some time posterior to its creation, by the will of God — nor indeed, whether it be eternal or limited in duration. In either case, or in any case, we find matter connected with its properties as the cause to its effects.

All observation, all experience and experiment prove, that by changing matter, we change its properties, and that these properties can be changed in no other way.

How slight soever the change in the organization of matter may be, a corresponding change in property and action results — how slight soever the alteration may be in the properties or actions of matter, such change depends on adequate mutation of its structure. Could we annihilate a single pound of the substance of our globe, we would, in so doing, effect, in some degree, the movements, not only of the harmonious host of our solar

system, but of other worlds, whose distance has defied the calculations of a Newton, and a Kepler, and which appear, even in the broad field of the telescope, but as the sparkling dust of the diamond.

Even the grain of sand has its property of gravitation, and its loss would affect the universe; and though the effect might not be *appreciable*, it would be as real as the confusion and chaos which might be occasioned by blotting from existence gigantic Jupiter. It is hardly necessary to attempt even the illustration or proof of a proposition, so well established, as that the properties and actions of matter depend on its composition and organization — that they are varied with its variations, and can be varied in no other way. Such a proposition possesses all the characters of a *first truth.*

This proposition is true alike of brute matter, and the organized portion of creation. It is in the latter, especially, that are observed the dependence of action on organization — of deranged actions on deranged organization. No change in organization, however slight, fails to cause corresponding change in property and action. No change in function, however inconsiderable, that does not depend on some adequate structural lesion. Health itself is constant change of structure — of necessity, then, disease must be.

The organic world is intimately connected with, and dependent on, the inorganic; they are but "*parts of one stupendous whole*," each is ever acting upon, and inducing changes, in the other — their history is a ceaseless round of action and reaction. The smallest insect causes some

change in the atmospheric ocean, by diminishing its oxygen — the tender leaflet, unnoticed in the silent forest, does the same, by diminishing its carbon; thus, illustrating the dependence of plants and animals on each other, and on inorganic matter — their power of changing its composition — its power of changing their organization — their power of distempering it — its power of deranging them. But, to come to the little world within itself, the microcosm — man — an integral portion of creation, a frail dependent on its munificence for every moment of his existence, a lowly pensioner on its bounties, and yet its master-piece and lord. His organization, and, consequently, his properties, actions, functions, faculties, are ceaselessly operated on and changed, by air, water, food, and other portions of matter, which, with him, constitute the machinery of the world. A certain, harmonious, and regular play of his functions is connected with certain regular states and changes of his organization, as effects to their causes — as the properties of matter to its composition. Such is the condition of health.

Any change from this state of the organism, which disorders the functions notably, is termed disease. Can there be any change in his organization, however slight, without consequent change in function? Can there be any change in function, however sight, without previous adequate change in the organization? Most assuredly not. To assert the affirmative would be to make the organization of man an exception in the universe, and unamenable to the laws governing every other material

being — to disregard observation — to set reason at naught — to wage war against first truths. To say that the actions or functions of any machine, living or dead, can be changed without changing its organization, is equivalent to saying that effects may exist without causes, and to say that there may be change in organization without change in function, is to say that causes may exist without their effects.

The loss of a single drop of blood — the inhalation of an infinitesimal portion of unwholesome air — the obstruction of a delicate capillary — a single degree of elevation or depression of temperature, cause changes of the organization, as real, though not to the same extent, as the exhausting hemorrhagy — the poisonous effluvia of the Pontine marshes — the rigors of Lapland, or the burning sun of equatorial climes, and, that such slight organic changes cause corresponding changes of function, no one who is accustomed to thinking will venture to deny. Here we have *causes*, *disease*, *symptoms*, in a degree, too slight to be appreciated, and hence they pass unnoticed and unnamed. They are too inconsiderable to be felt, and hence are not, in popular or even professional parlance, designated as morbid. The changes, then, which take place in the system, must be of a *certain degree* before they are appreciated — before they notably derange the functions, and, consequently, before they elicit from us the name *disease*.

It may appear a work of supererogation to insist on a proposition so plain as that, as is the organization, so will be the action; for, what we are contending for,

amounts to nothing more than this, which, as we have already said, possesses all the characters of a first truth, and is acted on, instinctively, by every grade of intellect, and in all the concerns of life.

It follows, as a necessary consequence, from what we have advanced, that the properties, the functions, the actions of the material universe, the human organization included, are fixed, fated, necessitated, bound to take place, in a certain invariable order, by the chains of an irrevocable decree — that the stupendous machinery of the heavens moves on and on, for ever, under the iron sceptre and irresistible impulses of necessity — that its action is as necersary as its being — that the metamorphoses which are constantly taking place on our planet — the tempest's rush — the lightning's flash — the earthquake's shock — the mysterious processes of vegetable and animal nutrition and growth — the secretion of a gland — the beat of the heart — the sensation of a nerve, take place in obedience to the binding law of necessity, and can never vary beyond the adamantine barriers of the organization. We admit, we avow this. Here is fate, which, according to the ancients, even ruled the gods. But man is held, by the common sense of his species, responsible *for some of his actions;* and, the same common sense says that he is not responsible for his *necessary actions.* Here are first truths, also, acted upon, by every grade of intellect, in all the concerns of life; these truths are the laws of the moral universe, and those which are opposed to them are the basis of the physical universe.

We are forced, then, to conclude that man possesses a *something* not subject to the laws of matter and organization; for, under any given circumstances, matter, in any form, acts, and can act, in but one way. The laws, the instincts, the common sense of the world, say, that under any given circumstances, man can act or not act — that he can act *either* of two ways; and, hence he is responsible for the way in which he does act. This high faculty of choice must, also, be possessed by its Great Author. Deny these propositions, and the moral world is a chaos. We need say no more. Philosophy, to say nothing of revelation, forces us to except, from the laws of matter, *necessity* and *fate*, God and the human will. The actions of all things besides are *necessitated*. Can the Great First Cause change the properties and actions of matter, without changing its composition? It would be impious to limit his power. Can the human will? No.

We do not feel the necessity of making an apology for this digression into the regions of ethics, as it is the counterpart of what we have said in regard to the laws of matter. We did not wish, in advocating what we regard as demonstrable in regard to matter, to appear to controvert what is equally plain in the philosophy of mind. What we have said of the former, rests upon observation and experiment. What we have said of the latter, is attested by consciousness and the consent of mankind, in every nation — every stage of civilization — in every age.

To return: the organization of man, acted on by various agents, is frequently changed to a degree incom-

patible with the regular and harmonious play of the functions. Here we have the causes of disease, (the agents,) disease itself, (change of organization,) and the resulting symptoms, (derangement of the functions.)

Physicians are generally agreed as to the causes of disease, and the distinction between them and disease itself, but they are not so generally agreed in distinguishing between disease and symptom — many of them including symptoms in their definition of disease.

Some have said that disease is a disorder of the forces of the system, the harmony of these forces constituting health; but *these forces* are evidently *properties* of the organization, and can be changed or disordered only by changing the organization. These changes of force are, therefore, symptoms, and not diseases.

Disease was defined by Plato, to be a disorder in the elements of the body; and, by Æsclepiades, a disorder of the invisible corpuscles of the body. These definitions of disease are equivalent to that we have given, derangements of organization the only tenable and rational idea of disease. These derangements in the "elements," the "*invisible corpuscles*," or the organization of the body, cause corresponding derangements of the "forces," the properties, the functions of the body, which are symptoms. Sylvius defined disease to be a *reaction of salts;* Brown, an *alteration of excitability;* Sydenham, an *effort of nature to throw off certain matters;* but evidently these definitions apply rather to symptoms than to disease. They are the results of certain states or conditions of

the organs, which states or conditions are evidently diseases.

Take, for example, hypertrophy of the heart, (a state or condition of the organ.) This state produces a strong pulse, tumultuous action of the organ, and dyspnea. Now, what is the disease, and what the symptoms, in this case? If we admit that symptoms are *effects* of *disease*, there can be no difficulty in answering the question. Again, take, for example, active congestion of the brain, with its results, cephalalgia, increased excitability of the senses, inability to perform mental labor. Can there be any difficulty, in this case, in distinguishing the disease from the symptoms? Most assuredly diseases are those states of the system which give rise to deranged function or action; and, if the word symptom has any meaning of its own, it must be deranged action or function. And yet, even Andral and Chomel, and other high authorities, persist in saying, that disease is deranged organization and deranged function, which is equivalent to saying that disease is both disease and symptom! Now, the distinction between organization and function is as clear as the distinction between anatomy and physiology, and yet it is disregarded; and, organization and function, states and actions, are embraced in the definition of disease, causes and effects, huddled together in the same category, as being one and the same thing: and, to add to the confusion, which results from such clumsy classification, the term *symptom* is, nevertheless, employed as meaning something else than disease! It would be better for such definers to say, that symptoms are that

part of disease which consists in abnormal action or function, and thus distinguish them from that other part which consists in changes of the organs; but the best way would be to view them distinctly as results of deranged organization, which, and which only, deserves the denomination *disease*. Nothing contributes more to confusion than the indefinite use of terms; half of the controversies and quarrels of men are attributable to it.

We define, then, the *causes of disease* to be all those agencies or agents which are capable of altering the organization, *diseases* themselves, the various alterations of the organs and *symptoms*, the resulting changes of function, and we shall endeavor to avoid the confusion which the use of these terms, in other and opposite senses, might induce. Moreover, the sense in which we use them, is that in which they are employed by almost all modern writers, of whose occasional abuse and confusion of them we have, however, complained.

We may as well notice here, what might, in the minds of some, militate against our definition of disease, viz— that deranged function always precedes that degree of deranged organization which we call disease. This is true; but, it must be admitted that this deranged function or action which precedes the full development of *notable disease*, is always the result of previous deranged structure, not so appreciable, and that, in the incipiency of most diseases, the change in organization is very slight. In all cases, the states of the organs are to their actions as causes to effects; and altered action or function can no more commence, independently of changed

organization, than effects can take place independently of their causes.

Diseases, then, being certain deranged states of the system, we proceed to enquire into the nature of these states, and to consider them, individually, in relation to their causes on the one hand, and their symptoms on the other. A glance at the normal structure of organized beings, should precede our reflections on its abnormal states.

Man, as well as the humblest animal and the humblest vegetable, is composed of the elements of matter which constitute the inorganic world; one portion of this matter being in a fluid, and the other in a solid, form; and, it is upon the mysterious affinity, which exists between these two forms of organized matter, that nutrition, that general universal action or function depends. Some species of organized beings possess organs; and, consequently, functions, which others do not possess; but, nutrition, the *sine qua non* of life and organization, is common, not only to all organized beings, but to every portion of every organized structure.

The fluids nourish the solids. It is from the former that the latter are first formed: the former constantly supply the waste and decay of the latter. We have said that this action depends on a mysterious affinity; but, it is, perhaps, not more mysterious than that which exists between an acid and an alkali. Why do an acid and an alkali unite? Why do the fluids combine with the solids? It is really as easy to answer one question as the other. If it be said there is an affinity between the

acid and alkali, it can, also, be said that there is an affinity between the solids and fluids. All that we can say of either, is, that these forms of matter influence each other — act on each, as they do, in virtue of their composition or organization.

These remarks alike apply to the lowest of the vegetable and the highest of the animal species; alike to the isolated cryptogamic cell, at the one end of the chain of organized beings, and the highly finished and complicated organism of man, at the other. The simple cell of the protococcus nivalis, consists of its solid and fluid, as well as the higher animals; for even these latter, with all their complexity of organization, are made up of simple cells.

All that is necessary to life and nutrition is this organism, consisting of a solid and a fluid. These are necessary; for life, in no degree, can exist without them. In some of the lower vegetables and zoophytes, immersed, as they are, in the fluid that nourishes them, and every part absorbing this fluid for itself, we find a total absence of any thing like a dependence of one part on another. The divided portions of such beings are, consequently, as capable of life as they are in their united state — nutrition being all that is necessary for life, and no part depending on another to furnish to it the nutritive fluid. Such would be the case with the tissues of the human system, if they were similarly circumstanced in regard to their nutritive fluid. The lungs are necessary, because they oxygenize it — the heart, because this fluid must be transmitted to the tissues — the secreting organs, because

they separate from it all that is hurtful — the nerves, because they excite the movement of respiration — and, we might add, the hands, because they labor to procure the substances from which this fluid is manufactured. In the zoophyte, every part is hands, stomach, lungs, heart, for itself; or, in other words, these organs are not needed, because every part draws directly from the medium in which it is placed, the elements of its reparation and the organs are necessary to life in man only so far as they are necessary to the supplying of each part with the blood.

The organs, then, were not added for the purpose of giving life to animals, but for the purpose of placing them in certain relations with the material world, and rendering these relations compatible with life. The brain was not bestowed on man because it is necessary to life, but to place him in a high attitude in creation, to enable him to comprehend himself, and his relations with his fellow-being, and, his God.

So far as life is concerned, all that is necessary in organized beings, from the lowest to the highest, is the solid and fluid, as shown in their simplest state, by the solitary cell. So far as health is concerned all that is necessary is, that this solid be supplied with this fluid in a certain quantity and of a certain quality. Change the quantity to a certain degree — change the quality to a certain degree, and we have a certain degree of changed composition or organization, which we have already defined to be disease.

These remarks apply as well to the complete organs

as to the ultimate atoms and cells of the system; for, the *special function* of every organ is as dependent on the blood as the simplest cytoblast; and, this will appear the more reasonable, when we take into consideration that these special functions are quite analagous to simple nutrition.

Thus, the secretion of milk, bile, or urine, is but the separation from the blood of some of its constituents; and, nutrition is but the separation from the blood of some of its constituents. Changes in the quantity and quality of the blood, therefore, affect the particular organs and special functions just as they do the general function of nutrition.

Are there not other modes of changing the organization besides operating on the equilibrium and quality of the blood? Certainly. The solids can be broken, torn, cut, bruised, &c., &c., but these states are not medical diseases; and, it is not in this way, as every one knows, that what are called diseases in ordinary parlance, are produced: and, even these injuries lead directly to the changes of which we have spoken, alterations of the equilibrium and quality of the blood. Illustration is not necessary, as every one can easily point out examples.

It is manifest, upon the slightest reflection upon the subject, that a medicine composed of solids and fluids, would be more easily deranged by altering the quantity and quality of the fluid element than in any other way.

Take, for example, a galvanic battery, the action of which finds close analogies in the animal system. It consists of solid plates and a fluid, which acts on them,

and thus gives rise to the galvanic force. Now, we can derange this arrangement by crushing and dislocating a portion of the plates. Such states would be the surgical diseases of the battery; but, if we would derange it, and thus lead to an alteration of its action, in a gradual and almost imperceptible manner, as the causes of disease act, we have only to alter the quality of the fluid by rendering it more or less acid, or its quantity. By doing this gradually, we imitate the action of the causes of disease; and the gradual changes in the action of the battery would represent the slowly developed symptoms of disease; or, we may rapidly abstract the fluid and cause a rapid failure in the action of the battery, and thus imitate the effects of sudden and considerable losses of blood on the human machine. It may be laid down as a general proposition that a machine is most frequently deranged in the way in which it is most easily deranged. The animal machine is most easily deranged through its fluid elements; therefore, it is in this way that derangements most generally take place — always, we think, except in cases of mechanical and chemical violence. But we are not forced to rest our creed upon such reasoning as this alone. We know that the causes of disease do act by altering the quality and quantity, local and general, of the blood — that cold contracts the vessels of the surface, and thus causes a stagnation of blood in the internal organs, (an alteration in the local quantities) — that irritation, of whatever sort, applied to any vascular part, causes an increased flow of blood to that part, (an alteration in the local quantities again) —

that high living and the neglect of exercise give rise often to plethora, (an alteration in the general quantity of the blood,) — that insufficient nourishment and bodily fatigue cause a diminution in the general quantity of the blood — and that miasmata and other aerial contaminations act through the lungs, and thus alter its quality. This is evident; for pure air is necessary to the proper oxygenation and decarbonization of the blood; any change in the air must then of course produce corresponding changes in the quality of that fluid.

If a knowledge of the causes of disease leads us to the conviction that they act by altering the quantity and quality of the blood, an examination of the diseased system adds strength to that conviction. In one case we see the faded surface, from which the life-current has receded, and hear the deep-drawn sigh, and the graphic complaint of internal oppression; in another, we have the flushed face, the throbbing carotids, the aching head. In one case, we behold the red distended veins of the gourmand, the crimson tide threatening the burst of hemorrhagy, or the thunder-stroke of apoplexy; in an other, the wan features, the attenuated muscles of the bed-ridden valetudinarian — and, every where, in the crowded lazar-house, in the hovels of the poor, and even in the mansions of the rich, we behold in the livid countenance, the jaundiced eye, in the specific exantheme, and in the prostrate energies of the system — evidences that the vital fountain is "touched corruptibly."

Post-mortem inspection repeats the same story. The gorged viscus, the anemic muscle, the dark dissolved blood,

are the principal sights that meet our eyes in the cadaveric examination of acute diseases. Still further, the changes in the solids themselves are but results of these alterations of the fluids. Does not hypertrophy depend on an increase in the local quantity of blood? Does not atrophy depend on an opposite state? And can cancer, tubercle, and other heterologous formations and depositions, alterations of nutrition, take place without previous alterations in the quality of that which nourishes, namely, the blood? Modern pathologists are agreed in referring all these diseases of the solids to altered nutrition; and, moreover, that they are referable to three classes, those of increased, of decreased, and of perverted nutrition; so, that the view here presented of disease, is based, not only on indisputable facts and impregnable logic, but on the highest authorities in medicine. We would offer, then, the following proposition, as a brief definition and formula of disease, namely: *that it consists in certain alterations in the quantity and quality of the blood, and alterations in the solids consequent thereon.*

The blood has been called, by inspiration, "*the life*" of the system; and observation has not only verified the assertion, but shown that the degree of life is in direct proportion to quantity of healthy blood — the least vascular parts having the least, and the most vascular parts having the most life; so that the measure of blood may be regarded as the measure of life, as the size and composition of bodies are the measure of their power of gravitation.

As already remarked, every variation in the organism

is not disease, so called, these variations being so slight, in many instances, as to be inappreciable; moreover, constant fluctuations within certain limits take place normally. The blood being the measure of vital activity, when an organ performs its function with energy, it has an increased supply of blood; and, as many of the organs have intervals of repose, there are constant variations in their amount of blood. The brain, the stomach, the mammæ, the uterus, act thus periodically. But, in addition to these healthy fluctuations, there are others which transgress the boundaries of our physical well-being, so slightly, or in a manner so evanescent and ephemeral, as scarcely to entitle them to the appellation of disease; and, yet they are degrees of those states, which, when aggravated, constitute what every body concurs in calling disease.

The *state of health* is bounded on all sides by the *states of disease*, and it is as difficult to say where the one ends and the other begins, as to say where one color of the rainbow ends and the other begins. They shade off insensibly into each other; they are separated by no chasm or hiatus, and such is the facility with which slight transgressions of the boundary line are effected, that it has been justly asserted that perfect health is a chimera. We proceed to examine, in detail, the states of the system, embraced in our formula of disease. These states, variously combined, constitute special diseases. They are the elements of disease. They are the A B C, which variously combined, make up the great volume of human suffering. The consideration of them, together with their

causes and remedies, is the province of general pathology, and the investigation of their ever varying combinations, as exhibited by individual diseases, belong to special pathology. It is clear that a knowledge of general pathology is as necessary to the knowledge of special pathology, as an acquaintance with the alphabet is to orthography and reading.

CHAPTER II.

ELEMENTS OF DISEASE.

In a former chapter we advanced the proposition that "disease consists in certain alterations in the quantity and quality of the blood, and alterations in the solids, consequent thereon." Whether this formula includes all the possible morbid states of the system or not, may be a matter of question; but the proposition that disease is alteration of the *organization or composition* of the animal machine, is, we think, incontrovertible. We are confident, moreover, that it will be difficult to point out any morbid action, any *lesion* of function, which does not depend on the alterations above mentioned, single or combined. If there be an exception, we apprehend that it is afforded by the nervous system.

There may be, for aught we know, changes in the brain causing *notable* lesion of innervation; which changes are produced by the operation of moral and other causes, without previous changes in the quantity or quality of the circulating fluid. These possible changes in the brain may be merely alterations in the juxtaposition of the par-

ticles or organized atoms of which it is composed, and bear a close analogy to the Isomeric changes, which chemists have demonstrated as characterizing certain inorganic bodies. If bodies, composed of the same elements, in the same quantities, may be possessed of totally different properties, on account of the difference in the juxtaposition of their particles, we do not see why such change of particles might not take place readily in a soft and delicately organized structure, such as the brain; nor why such changes might not be effected through the senses, independently of any lesion of the blood.

We are by no means certain that exceptions to our formula exist; and, having stated what we regard as the only possible one, we proceed to the enumeration of the elements of disease, embraced in the general definition. Under the head of changes in the quantity of the blood, we shall treat of—

First. General plethora.

Second. General anemia.

Third. Local plethora, or, congestion — and,

Fourth. Local anemia.

Alterations in the quality of the blood, will embrace the various changes which the elements of that fluid undergo relatively to each other — the changes produced in it by mal-assimilation and suspended or imperfect secretion, and the changes in it, which characterize the essential fevers. Alterations of the solids consequent on the foregoing changes, will include all those various modifications of the solid structures which constitute the study of the pathological anatomist; and, which are regarded, by most

modern writers, as lesions of nutrition, as hypertrophy—atrophy—which are examples of increased and diminished nutrition, and the various deposites and growths, which are the result of perverted nutrition.

It is not easy to conceive how nutrition can be changed in any other modes than these. Increase, decrease, and perversion, in action of any kind are its only possible variations. Increase, decrease, and change of structure, in an organ, are its only possible mutations.

It is equally difficult to conceive how the nutrition of a part can be increased without increase (in the part) of the nourishing material (the blood;) how the nutrition of a part can be diminished without diminution of this fluid, or perverted, without previous perversion of this fluid; in other words it is difficult to conceive how altered actions in the solids can be effected except by previous alterations (quantitative or qualitative, or both,) of the fluids.

After all, the formula of disease, which we have laid down, corresponds, as far as it goes, with the lesions, in which M. Andral makes all disease to consist. If it does not embrace all of Andral's *lesions*, it is because, that, in our estimation, some of said lesions are but *symptoms*, and not properly *diseases* — *actions* and not *states*. Diseases, according to this eminent pathologist, are referred to the following classes of lesions:

First. Lesions of the circulation, including plethora, general and local — anemia, general and local — in a word, those elements of disease which are embraced by the alterations of quantity in our formula.

Second. Lesions of nutrition, answering to the alterations of the solids in the formula.

Third. Lesions of secretion:—we object to this class, and contend that its lesions are but symptoms. When secretion is *increased*, *diminished*, or *perverted*, it certainly depends on some *morbid state* of the organ or blood, and certainly, in such cases, there can be no difficulty in distinguishing between *disease* and *symptom.* Is not ischuria a symptom? Is not dropsy a symptom? Is not secretion of saccharine matter a symptom? And, are not these the examples of changed secretion which even M. Andral brings forward?

Andral's fourth class, are lesions of the blood. These correspond with our "*alterations* of *quality;*" and, embrace, of course, all the changes which this fluid undergoes in disease.

His fifth class, are lesions of innervation, embracing all the known changes in the actions or functions of the nervous system — spasm, palsy, pain, anæsthesia, &c. &c.; evidently, this is but a class of symptoms — evidently, these lesions of innervation are not diseases, if there be any distinction between symptoms and disease. It is scarcely necessary to insist on this, as no one at the present day, certainly not M. Andral himself, would deny that the *state* which produces the spasm is the *morbus ipse*, and the spasm itself but the symptom.

It is seen that our formula embraces three of the five classes of Andral. Lesions of circulation — (alterations in quantity) — lesions of the blood — (alterations in

quality) and lesions of nutrition — (alterations in the solids consequent thereon.)

We think it is as clearly seen that the two remaining classes of Andral are but symptoms dependent on the above states, single or combined. Dr. Williams (principles of pathology) has fallen into a similar error. His functional or dynamic diseases are, according to his own showing, dependent on some one or more of the *states* of the system embraced in the three classes of Andral, which correspond to the brief classification we have ventured to give — his functional or dynamic diseases (alterations in sensibility, tonicity, &c.,) are, therefore, but symptoms, if there be any distinction between disease and symptom.

According to Brown, and Darwin, and many of the older authors, disease consists in action or function, increased or decreased, and the states of the system producing it were called the "*proximate causes.*" With them the disease consisted of the "*ensemble*" of the symptoms, and they deserve the credit of consistency at least, for they always kept up the distinction, between what they called *disease* and its *causa proxima.* The moderns more enlightened but less logical, whilst they in general agree that the proximate cause is the disease itself, and the resulting changes of function are but symptoms, are guilty, frequently, of confounding them to a degree which renders still more obscure and hard to be understood, a subject which is in its nature sufficiently difficult of comprehension, even when stated with all the precision and distinctness of which human ideas and human language are capable.

These states of the system, although they would seem few in number, embrace a wide, and, in some portions, an almost uncultivated field. In degree and in combination, they are capable of an almost endless variety — a variety which every observer has remarked in special diseases.

In one case we observe scarcely more than a single element; say, for example, congestion; in another, three or four elements, as in phthisis pulmonalis. Here we have changes in the quality of the blood, congestion and certain alterations in the solids. And, again, in other cases, almost all the changes of which the animal machine seems capable, are observed.

It is important to keep in view, as well the order in which these changes are effected, as the distinction between them and the actions or the symptoms which result.

A disease, or element of disease, in a particular case, may be primary (protopathic) that is, produced by the direct operation of the cause; or secondary, (deuteropathic) that is, caused by a previous disease, and even this secondary affection may produce a tertiary one, and so on. Thus chronic gastritis causes dyspepsia, which, in its turn, gives rise to an altered and impoverished state of the blood, which causes, or may cause, that deranged nutritive or secretive action which results in the tubercular deposites; these may irritate as foreign bodies, and cause inflammation, which causes a host of very obvious symptoms.

Here we have not only primary and secondary, but tertiary, and even quarternary diseases, those which are mere

symptoms of the first, becoming causes of the second, and what are mere symptoms of the second becoming causes of the third, &c., &c.

The modifications in kind, which the circulating fluids may undergo, are sufficiently numerous and varied, to account for what have been called, and are yet by some, properly enough called specific diseases, as small pox, measles, scarlatina, and the long list of the exanthemata, and other essential fevers; and, also, the specific phlegmasia; as, scrofulous, arthritic, rheumatic, and venereal inflammation. It might be contended, that in chancre, which is a specific inflammation, the blood is not affectad. It may not be generally, but that which circulates in the very tissue of the ulcer must be necessarily somewhat so. It would not be difficult to cite authorities in favor of this view of specific affections, but authority should not be relied upon, nor is it needed when facts and reasons are at hand.

It is a fact, that small pox, measles, and scarlatina, and other essential fevers are communicable through the atmosphere, and it is reasonable to conclude that the peculiar virus of each of them enters the blood.

It is a fact, that the first may be communicated by absorption into the current of the circulation.

It is a fact, that in gouty inflammation deposits of the lithates take place, and it is reasonable to suppose that they are deposited from the blood.

It is a fact, that scrofulous inflammation, or inflammation in scrofulous persons, differs in many respects from common inflammation; that is, inflammation with pre-

viously healthy blood; and, it is reasonable to suppose, that this difference is caused by a deteriorated condition of the blood, which is known to exist.

Before entering upon the consideration of the individual morbid states or elements which we have enumerated, we will rapidly survey the causes which produce them, and endeavor, in a general way, to point out the modes in which these causes act. Unfortunately the nature of many of them is unknown, and may, probably, for ever remain a secret. We expect, much however, from the closely observing and matter-of-fact spirit of the age in which we live — much, from the searching analysis of the chemist and the future revelations of the microscope. Immortal will be the name of him who shall detect and expose those as yet non-cognizable enemies of human health and happiness, the various miasms.

CHAPTER III.

THE CAUSES OF DISEASE.

Under this head are included all of those agencies, whether physical or moral, which are capable of deranging the organization and the functions of the animal machine. They are found everywhere — in the air we breathe — the water that quenches our thirst — the food that nourishes us — the clothing that protects from "summer's heat and winter's cold." They beset the path of every-day life, and the ordinary routine of the functions — the exercise and the repose of the organs being alike exposed to those transgressions of the limits of health, which we term disease.

If whatever is capable of affecting the organization and functions of living beings, are, or may be, causes of disease, those agents which constitute our *materia medica*, are also included, and there would seem to be no distinction between morbific agents and therapeutic agents. There is none; that is to say, all the agents or agencies which affect living beings, are morbific or therapeutic, according as they are modified; according to the circum-

stances under which they act. Some of these agents we cannot modify; as many of the aerial contaminations — the operation of others, it is difficult to avoid as heat and cold — the ignorance of man, of the circumstances under which he is exposed to these and a thousand other modifiers of his system, renders him liable to be injuriously affected by them, and distinguishes them as *causes of disease* from those other agents over which he ordinarily exerts a controlling power. Those agents, then, which operate on him in spite of himself — which are not subject to his will — are generally morbific — those which he can direct, are therapeutic; whether, then, an agent acts *morbifically or therapeutically*, depends on the circumstances in which it operates. The apothecary's drugs would be so many morbific agents, did they act on the system undirected by the hand of skill; and, even the miasms and animal poisons would become therapeutic agents, could they be subjected to the will of the physician. To some extent, indeed, they have been so subjected.

Witness the prophylactic action of cow-pox, and the facts in favor of the power of marsh exhalations in the cure of phthisis, the time and the circumstances of the patient's exposure to them being regulated by the physician. But are there not agents which, under all circumstances, are morbific? Are there not causes which are *per se* deleterious? The animal poisons might with propriety be termed so; nevertheless, they must exist in a certain degree of concentration and strength, in order to produce their effects; and there can be no doubt, that, in

the process of time and progress of science, even small-pox and measles may be subjected to the physician's control, and their baneful essences directed as therapeutic agents in the cure of some forms of disease. Strictly speaking, there are *per se* neither morbific nor curative agents; what are called poisons produce no appreciable effects, unless administered in sufficient doses — a cup of cold water may cause death by its over dose.

Various classifications of morbific causes have been proposed, their principal basis being their modes of action, order of succession, and, their nature.

Thus we have predisposing and exciting causes; starvation predisposes to disease, and the poison of typhus then the more readily excites it. Thus pestilence treads on the heels of famine.

The old division of causes into *remote and proximate*, was founded on their order of succession; the remote cause being that agent or agency which produced a modification of the system; the proximate cause, this modification itself, which in its turn produced the symptoms. But, as we have before said, and as all admit, what was called the proximate cause, is the disease itself. Hence, this classification is obsolete. The division of causes based on their nature is convenient, but it is unnecessary to insist much on it, as it is but little more than designating them by universally known and appropriate terms — as, *physical and moral, chemical and mechanical causes, &c., &c.*

We have alluded to the classification of causes, accord-

ing to their modes of action, into *predisposing and exciting*, which implies, that, in the production of disease, two causes are at least in action. This is generally the case, but a cause may be sufficient to produce disease of itself, as the virus of small-pox, and of the *exanthemata*. Such might be denominated determining causes. A moment's reflection will show, that an agent, which acts at one time as a predisposing cause, may act at another time as an exciting or a determining cause — the classification, here spoken of, being founded merely on the modes of action which a single agent may assume at different times, and under different circumstances.

A more important subject than systems of classification, is a knowledge of these causes, and of the modes in which they change the organization of the living fabric. The causes of disease act generally in a manner tolerably well ascertained—some of them increase the general quantity of the blood, others diminish it — others again, deteriorate it, or act in two of these modes simultaneously.

Thus, over-feeding, and drinking, lead to general plethora, which predisposes to apoplexy. Want of nourishment leads to anemia, and a general debility which predispose to other diseases.

The mode in which such causes act is plain to every one. Atmospheric and other poisons enter the circulation mainly through the lungs, deteriorate the fountain of life, and give rise to the various forms, kinds and varieties of essential fever. Cold and other agents contract the capillaries of the surface, and cause internal congestions. Irritants of every kind cause a flow of

blood to the parts to which they are applied "*ubi irritatio ibi afluxus.*"

Let us contemplate these morbific agencies a little more in detail, commencing with those which diminish the quantity of the blood and impair nutrition, and are hence called debilitating causes. They most generally act as *predisponents* to disease, but they may act as *excitants*, or even as determining causes.

1st. *Imperfect Nourishment.* That this will gradually diminish the amount of the vital fluid is too plain to require comment; and, this reduction of the blood, carried far enough to notably derange the functions, is a disease of itself. This diseased state, moreover, predisposes to other diseased states; aerial, and other poisons, more readily enter, and are with more difficulty eliminated from the system thus depleted and weakened by starvation. This is perhaps due to the increase of the absorbing, and the diminution of the secreting function occasioned by the comparative emptiness of the vascular system. Be this as it may, the system is so organized that one of its functions is to rid itself of deleterious agencies; and observation has proved that this power or function is lowered by causes which weaken the system in general. Observation has shown, that, when either epidemic or endemic causes of disease assail a community, those who suffer the privation here alluded to, are its most certain and numerous victims. They are unable to sustain the pressure which may even scarcely be felt by their better fed neighbors.

Such we have seen to be the fate of the ill-fed popula-

tion of Ireland. Ship fever came up to the aid of famine, in the work of destruction — but for the state of the system induced by imperfect nourishment, the cause of ship fever would have remained comparatively inactive.

2d. *Confinement in Impure Air.* We do not allude here to those states of the atmosphere in which it is charged with the ordinary vegetable and animal poisons, but merely to the want of proper ventilation, so necessary to the constant renewal of it. The air we breathe is as necessary to the proper constitution of the blood as our food; any deficiency of it, therefore, will lead to disease, on a principle as well understood as that on which starvation causes disease. The want of a sufficient amount of air, or the breathing of contaminated air, necessarily causes changes in the blood, incompatible with the healthy play of the functions.

3d. *Depressing Passions — Grief — Despondency, &c.* The mode in which these operate is not so well understood; that is, we cannot so well explain how the impressions, which these passions produce on the brain, affect the functions of digestion, nutrition, &c.; but, that they do affect these functions and impair them, and lead to a diminution in the amount and an alteration in the quality of the blood, every one knows. The three causes above enumerated, constitute the triple scourge of the poor.

4th. *Excessive Evacuations.* These, of course, produce anemia, and consequent exhaustion. They are generally the result of previous disease, and of consequence, the states of the system which they bring

about, are secondary diseases; we have already alluded to the fact, that the system is occasionally the seat of a catenation of diseases, standing in the relation of cause and effect to each other.

5th. *Exposure to Cold* — One of the most frequent causes of disease. Perhaps the principal action of this agent, is, the merely physical one of causing a contraction or condensation of the solids, and thus interfering with the equilibrium of the fluids; at any rate, in this way can be explained the greater portion of the diseases attributed to it, as pneumonia, bronchitis, and various other inflammatory affections. The fact that reaction follows the temporary application of cold, enables the physician to employ it with advantage in the cure of many diseases. Indeed, its direct action, long continued, is available in a therapeutic point of view in encephalitis and various other disorders. This, however, is but an illustration of the principle, that an agent is morbific or therapeutic, according to the circumstances under which it acts.

6th. Heat expands the tissues, and invites the flow of the blood to the parts on which it acts. Thus, when carried to a certain degree, it debilitates the system by scattering or spreading the blood over a larger surface. It also debilitates it by rarifying the air, and thus diminishing the quantum of oxygen inhaled.

The office of the lungs being to convert the blood from *venous to arterial*, by the introduction of oxygen, and the elimination of carbonic acid; and the office of the liver being to separate carbonaceous materials from the blood

also, and thus aid the lungs in the process of depuration; it follows that the rarefied state of the air, induced by a high temperature, by diminishing the elimination in the lungs will throw a greater onus on the liver, and thus engender disease of that organ. Hence, disease of the liver in warm seasons and climes. If, in addition to this state of things, articles of diet, rich in carbonaceous compounds, be indulged in, the liability to hepatic derangements will be increased. Hence, the necessity of a light diet in warm regions.

Is it necessary to invoke, in accounting for the fevers of warm climates, any other agencies than the heat of the day, alternated with the coolness of the night, acting in conjunction with irregularities in diet, exercise, &c.? Is malaria — a positive poison, necessary to explain them?

7th. *Over-Feeding.* This is a fruitful cause of disease, especially when accompanied with insufficient exercise. Active exercise, by facilitating the metamorphoses of the tissues, increases the demands of the system for nutritive materials, and thus tends to prevent excessive repletion. It is unnecessary to go into the *rationale* of the production of plethora by over-feeding.

8th. *Intemperance in Drinking.* That alcoholic liquors enter the blood and thus stimulate the brain and other organs, is generally admitted. To explain the manner in which it operates on the organs, when once in the blood, and to designate the exact state of the organs produced by it, is impossible in the present state of science. We may say, in general, that it causes congestion of the

brain, which becomes after a while accustomed to this increased quantity and changed quality of the blood; and, hence, the tremor, the wakefulness, and the cowardice manifested in such cases, when the practice of inebriety is abruptly abandoned. For, the sudden abandonment of the stimulus causes a sudden diminution of the amount of blood in the brain. To this comparative or relative anemia, are probably due the phenomena of *delirium tremens*. This relative anemia, may, however, be *hyperemia*, the state of health being the standard of comparison. It is anemia, *only*, in comparison with the state of engorgement by which it is preceded. The injurious effects of hard drinking, are not, however, confined to the brain. The kidneys, the lungs, the liver, engaged as they are in eliminating alcohol from the blood, suffer in their textures, and when they are assailed by inflammatory affections, it is far more difficult to relieve them, than it is found to be in persons of temperate habits. The drunkard's *pneumonia*, *hepatitis* or *nephritis* are not easily cured.

9th. *Local Irritants.* Alcohol, of which we have just spoken, is a local irritant; but, it is also a general irritant of a peculiar nature. By its local action it is capable of inflaming the stomach and bowels, upon the same principle on which all other irritants act. The common saying, *ubi irritatio ibi affluxus*, applies to the whole class of irritants. The action of a drop of the tincture of cayenne on the web of a frog's foot is repeated, perhaps, in every case in which this order of causes operates, be they mechanical or chemical. At any rate, irritants

cause congestion in the parts on which they act. Under the head of inflammation, the mode of its production will be more particularly considered.

10th. *Malaria, Marsh Miasmata.* The frequent occurrence of paroxysmal fever, dysentery, and certain other forms of disease in the neighborhood of marshes, and low damp situations, generally, has led to the very prevalent conclusion, that a peculiar poison is generated in such places.

Three circumstances have been considered necessary to its production, viz: heat, moisture, and vegetable matter in a state of decomposition.

The observations of Ferguson, and others, however, demonstrate, that vegetable decomposition is not necessary. Paroxysmal fevers have been observed to arise in their worst forms, in extended sandy plains, on which no vegetable matter could be found. Indeed, there is evidence which no mind can resist, that vegetable decomposition is not necessary to the production of intermittent and remittent fevers.

We shall not pretend to decide the question as to whether these fevers are caused by a positive agent, a material something, diffused throughout the atmosphere, or by those atmospheric vicissitudes to which we have already alluded, caused by the heat of day alternated with the chillness of night, aided by moisture.

It seems to us that the facts, accumulated on this subject, need careful reviewing before this question can be decided; perhaps it is impossible to decide it without additional and more careful observations.

Whatever the decision may be, it is evident that the blood is primarily changed in these fevers; if it be decided that there is a positive agent in the atmosphere which produces the mischief, that agent must of necessity act through the lungs — must, of necessity, affect the blood. If it be decided that a merely rarefied state of the air — a state of the air in which it is poor in oxygen, is a part of the cause of these diseases, the conclusion must still be, that the blood is affected by being left in a dark carbonaceous condition. Cold, we admit, acts on the solids, and, if the chilly nights have as much to do in causing these affections, as the hot days, then the solids are as much acted on, primarily, as the fluids. It is very probable that physical exertion, which can be illy supported under high temperature, is a common exciting cause of the disease of warm weather. For, physical exertion changes the blood rapidly from *arterial to venous*. But a hot atmosphere is poorer in oxygen, than cold air. Hence, the blood, in heated air, cannot be so rapidly changed from *venous to arterial*, as the system requires. This venous condition of the blood would seem to be a principal element in what is called *sun-stroke*. Cases are of almost daily occurrence, in this city, during the hot season. They are confined to those who labor in the burning sun, and they present the phenomena of partial *asphyxia*. Doubtless, in many cases, congestion of the brain constitutes a principal pathological element.

11th. *Contagious Causes, Idio-miasmata Animal Poisons.* Certain diseases, as, small-pox, measles, scarlatina, and typhus fever, are evidently caused by a *something*

emanating from the bodies of persons laboring under these diseases; that is to say, they are contagious. These emanations from the bodies of the sick, are diffused in the air, and inhaled by those in their immediate vicinity; therefore, these causes of disease act through the blood. To say that they are swallowed with the saliva, and first act on the stomach, as Dr. Chapman teaches, is about as reasonable as to assert that when arsenic is swallowed, its first effects are upon the lungs or kidneys — evidently, in this case, the first effect is on the stomach. It is equally evident that when the poison or cause of disease is diffused throughout the atmosphere, it must act through the lungs on the blood, unless it is strong enough to cause, by its mere contact with the mucus surfaces, spasm of the glottis — then the first action is on a solid.

Common sense would dictate ventilation as a means of weakening the power of those effluvia — common sense would decide that but few patients laboring under contagious affections should occupy the same ward or chamber. One patient, sending forth effluvia of a deleterious character, would not be capable of poisoning, to any great degree, the air in a well-ventilated chamber, but a half dozen similar patients would infect, to a considerable and dangerous degree, the air of a confined room. One heated stove would be incapable of warming, to a high degree, a large open room — a half dozen similar stoves would heat, to a very unpleasant degree, a small well-closed room.

Among the causes of disease are generally enumerated

the *temperaments — the different periods of life* — as, infancy, childhood, adolescence, &c., and *certain hereditary taints.* Now, the distinction between these and the *causes* of disease is obvious. It is just the same as that between *disease* and *cause.* The temperaments — ages — hereditary taints, are *states* of the system which have been produced by some cause or causes; and, the states themselves, are diseases, or approximations to disease. Under the head of *etiology* may be classed all the agencies and circumstances which cause these predispositions to disease, but not the predispositions themselves. We may consider them causes of disease, only, as we consider one disease the cause of another, or a primary, as the cause of a secondary disease.

These predispositions are, themselves, certain states of the blood, and the results of those states. What is the sanguine temperament, but a condition bordering on *general hyperemia?* The lymphatic, but a condition nearly related to *anemia?* The bilious, but a condition of the blood which characterizes *bilious diseases in general?* — and, so on, of as many temperaments as authors may choose to enumerate. The blood is changed, both in its quality and determinations, in the different ages.

The hereditary taints are evidently states of the blood and their results. It is hardly necessary to insist on this. The causes of all these predispositions are those to which allusion has already been made — as, food, air, &c. These states may be produced *directly,* in the individual, in which case the predisposition is said to be acquired — or the causes of them may have acted on his parents,

and produced in them the predisposition which may have been transmitted to him; in which case, the predisposition is hereditary. No one can fail to see as plain a distinction between the *predispositions* and the *predisposing causes* which produce them — as that between the irritant and the inflammation caused by it.

We have noticed, in a general manner, the causes of disease and their modes of action: some of them act primarily on the solids, others on the fluids; but the states of the system, induced by them in both cases, are certain changes in the quality and quantity of the fluids, and the alterations of the solid structures consequent on these states.

We have not, in detail, noticed all the causes of disease. We have not been very particular in classifying them — classifications are but scaffoldings which are designed to aid in the erecting of the temple of knowledge; and, when they are too complex, they rather interfere with and hinder, than promote the erection of the building.

We have not mentioned, amongst the causes of disease, except incidentally, excessive bodily and mental exercise. It is well known, however, that such exercise of the organs renders them centres of fluxion — causes congestion of them, which congestion, though normal within certain limits, becomes disease when these limits are transgressed. These remarks apply as well to overthinking, as the over-action of a muscle or gland.

In speaking of infectious causes of disease, we have asserted that they must of necessity act through the

lungs, and, therefore, primarily on the blood. This applies of course only to those which act through the atmosphere. Some of them can be communicated by being applied to an abraded surface, as small pox. Hydrophobia and syphilis appear to be communicable in no other way. The same may be remarked of many other poisons. And yet, the primary action of these is on the blood, through the absorbent vessels. Some poisons powerfully irritate the parts to which they are applied, and act in a two-fold manner, producing local congestion or inflammation, and at the same time, or subsequently, contaminating the blood. That is to say, they cause changes in the local quantity, as also in the quality of the blood.

Many objections have been urged against this view of the action of causes, and the nature of disease. We have said ourselves that some nervous diseases might possibly constitute exceptions. It has been asked, what change is there in the quality or equilibrium (local quantities) of the blood in death by lightning? We answer, that is said, on good authority, that the blood has been found in such cases in a dark dissolved state.

It has been confidently asserted, that hydrocyanic acid kills instantaneously, by some sudden impression on the nervous system, there being no time for absorption or revulsion to take place. This is, doubtless, asserting too much; for, experiment has proven that this poison is absorbed, and has no effect, except when mingled with the blood. In proof of this, we quote the following from Matteucci's "Lectures on living beings:"

"Having made an incision, ten inches long, in the belly of a horse, he (Panizza,) drew out a fold of small intestine, in which arose several small veins, which, after a short course, terminated in a single very large mesenteric trunk, before any small veins from the glands had emptied themselves into it. This fold, nine inches in length, was tied by a double ligature, in such a manner that it could receive blood by a single artery only, and could return none to the heart except through the venous trunk above described. An aperature was then made into the fold, for the purpose of admitting a brass tube, which was so fastened, by means of thread, that the substances to be introduced should not touch the bleeding edge of the opening. This being done, a ligature was passed under the vein receiving the blood from the fold. The ligature was tightened; and, in order that the circulation should not be stopped, the vein was opened to allow the escape of the returning blood. Then, by means of a glass funnel and the brass tube, some concentrated hydrocyanic acid was introduced into the fold, and the tube then closed. The venous blood returning from the intestine was immediately collected, and found to contain hydrocyanic acid, but the animal presented no symptoms of poisoning, notwithstanding that the nerves and lymphatics remained untouched.

"In another experiment, Panizza, instead of tying and opening the venous trunk where the small veins discharged themselves, merely compressed it at the moment the hydrocyanic acid was introduced. There were no symptoms of poisoning, but shortly after removing the

pressure, symptoms of poisoning occurred, and the vein being opened, the blood was found to be impregnated with the acid.

"Lastly, in a third experiment, Panizza quickly, but carefully, removed all the lymphatic vessels and nerves of the intestinal fold, and hydrocyanic acid being poured in speedily, destroyed the animal, provided that the vein was untouched. Venous absorption is thus proved by the most accurate experiments.

"In some works on Physiology, it is stated that the fact that substances are detected in the urine a few minutes after this introduction into the stomach, is opposed to the opinion that absorption takes place by means of the blood vessels. But this objection soon falls to the ground when we consider the rapidity of the circulation of the blood."

It seems to us that no one can doubt, after reading this account of the experiments of that accurate observer, Prof. Panizza, that even this most rapidly fatal of poisons, hydrocyanic acid, acts through the blood. The experiments of our colleague, Prof. Blake, have established the same conclusion.

We here close our general remarks on Etiology. In writing these chapters, we have marked out for our guidance no very definite course. Our desire is to treat of the various topics embraced by an outline of general pathology, in that order which may occur to our mind as the most natural and connected.

We have given not only a definition, but a brief classification of the elements of disease. We have rapidly

glanced at their causes, and the modes in which those causes operate.

It seems to us proper to give a concise view, in the next place, of symptoms and signs — enumerate them — discuss their relative importance, and say something of the diagnosis and prognosis of disease, which are based upon an accurate knowledge of them. They are the language of the suffering organs, without a thorough knowledge of which, it is impossible to understand their ever-varying complaints, and, hazardous to attempt to relieve them. Even benevolence cannot act without sin, unless guided by science. The mercenary quack, who interferes — destitute alike of the impulses of humanity and the lights of knowledge, deserves the execrations of God and man.

CHAPTER IV.

SEMIOLOGY — MODES OF DEATH — ACTION OF REMEDIES, &c.

Symptoms and Signs. — Symptoms are the result of those changes in the organism called diseases. They are altered functions. When the brain is inflamed, there are various changes in its functions of thought, sensation and volition, as delirium — intolerance of light and sound, spasms, &c. These are altered functions or symptoms. When the same organ suffers a sudden reduction of the amount of its circulating fluid, there occurs another train of changes in thought, sensation and volition. They are weakened, or temporarily abolished. Similar remarks may be made in regard to all of the organs.

Observation alone has afforded the interpretation of these changes of function. We could not, *a priori*, say that a given alteration in an organ would produce certain given symptoms; nor could we, reasoning from effects to their causes, say what changes in the organs any given symptoms indicate. The knowledge which enables us to ascend from symptoms to disease — from changes of function to the changes of organism, on which they depend, is

derived from accumulated observation on the living body compared with the revelations of post-mortem inspection. By these lights, afforded by the living and the dead, the physician is enabled to refer the phenomena of diseases to their proximate causes.

What is the distinction between a symptom and a sign? It may be laid down that all symptoms are signs — but that all signs are not symptoms. The sympt oms are the *vital signs* in contradistinction from those signs which are *physical* or *chemical.*

Many of the functions of the animal machine differ widely from any thing we see taking place in the world of inorganic matter. We may instance, again, thought, sensation, and volition, as also secretion and nutrition— nothing in the physical world even imitates some of these processes.

These are exclusively vital *signs* or *symptoms.* Some of the functions are performed, at least in a great measure, on purely physical principles, and are explicable by well known physical laws, as locomotion, the movements of the heart, lungs, &c. Alterations in these functions are also symptoms or vital signs, but not exclusively; they are also *physicnl signs,* as they are called, because explicable on well known physical principles. Here the same phenomenon is at once a *symptom* and a *sign.* But there are certain phenomena presented by the diseased body, which are not alterations of function— which are not, therefore, symptoms—as the aspect and appearance of the exterior, the color and other qualities of secreted fluid, the sounds elicited by percussion,

the gurgling of matter in the tubes or cavities of the lungs, &c., as appreciated by auscultation. These are exclusively explained by physical laws alone, and therefore properly termed *physical signs*. The *signs* furnished by the analysis, or testing of the secretions, might, with propriety, be called chemical *signs*.

As physics and chemistry are more *certain* sciences than that of life, properly so called, so, also, physical and chemical signs are far more certain and reliable than mere symptoms or vital signs. When we have pain, nausea, &c., (pure symptoms,) we cannot, in many cases, say on what they depend. Not so of the cavernous blowing, the crepitant rhonchus—not so with the chemical reagent. What may have produced the cavity in the lungs, or the albumen in the urine, are questions which cannot be solved but by the previous or attendant symptoms. As the physical and chemical sciences advance—as their application to the phenomena of organized beings is extended, they will, doubtless, be rendered available in the explanation of many functions, which are at present regarded as entirely beyond their domain.

The symptoms and signs, presented by the diseased system, will necessarily vary in kind and degree, according to the seat and intensity of individual maladies. A knowledge of anatomy and physiology will point out the organ diseased; and the degree, to which the symptoms vary from healthy functions, will indicate the grade of the disease.

To ascertain the organ affected, or state of the system, is to *diagnosticate* the kinds of disease; but, in order to

foretell its termination with any degree of certainty—in other words, to *prognosticate* well, the degree of the malady must be carefully considered.

In the investigation of the phenomena of disease, the first thing that meets the eye of the physician is the general appearance of the patient. A mere glance at the face and hands will diagnosticate anemia from plethora, or even ordinary health. How characteristic are the face and hands of consumptives! Not only does this first sight of the patient decide the question of plethora and anemia — it affords important signs as to the quality of the blood: the bilious conjunctiva, the dingy and suffused cheek, and the various eruptions of essential fevers, are examples. The attitude and physiognomy of the patient are equally valuable in a diagnostic point of view. The pulse, which will be examined during this general survey, is, perhaps, the most important of all the symptoms and signs of disease. When it varies but little in strength or frequency from the healthy standard, in acute diseases, as the phlegmasia and the fevers, it may be safely presumed that whatever the disease may be *in kind*, it is not dangerous in *degree;* whereas, a pulse of 150 beats, per minute, is always a grave symptom, especially in adults; and when much above this number and persistent, the prognosis must be unfavorable.

Neither the pulse, nor the inspection of the exterior of the patient, can, however, determine the local element or elements of disease. To do this, a strict examination of the functions of the organs and parts is necessary. Most physicians commence with the head and interrogate

the organs, *a capite ad calcem.* A few questions will determine the condition of the brain in most diseases. Is there no change of sensation, volition or thought? Is the sleep natural? Is there no pain? There is no disease, and vice versa; the kind and the degree of the derangements of these functions, aided by the history of the case, determining the nature and intensity of the local malady. In the meantime, or in the next place, the tongue will be examined; but so little is positively known in regard to the indications it affords, that it need not be dwelt upon here. There is generally a furred tongue in fever, whether symptomatic or essential, and it becomes, in most cases of a typhoid character, dry and red. The examination of the fauces, the neck and the functions of deglutition and of voice, would take place about at the same time.

The chest comes next in order. 1st. Is there pain or not? Is the number of inspirations, per minute, diminished or increased? Is there any cough? The presence or absence of these symptoms, or any part of them, will afford considerable insight as to the condition of the lungs; but auscultation and percussion are necessary to clear away all difficulty in regard to their state. The dry rhonchi, *the wheezing* of bronchitis, the crepitant rales of pneumonia, the dulness on percussion over the engorged lobe, the blowing and gurgling of the tubercular cavern, &c., are unfailing signs of their respective physical causes, and too plain to every medical reader to require explanation.

If changes in the respiratory sounds indicate corres-

ponding changes in the tissues of the lungs, the same is no less true of the sounds of the heart. The increased sound of dilatation, the increased impulse of hypertrophy, the roaring of the cataract in miniature, caused by the passage of the blood over diseased, perhaps osseous valves, are equally certain in their diagnostic import.

The diseases of the abdominal viscera are less easily discerned. Nevertheless, we are not obliged to rely in their investigation, as in those of the brain, upon the symptoms alone — percussion and auscultation are, to some degree, available, even here; but palpation is far more important than either auscultation or percussion— the soft and yielding walls of the abdomen allowing the organs they envelop to be felt by the hand, and thus enabling the physician to appreciate any change in their volume or sensibility. Thus can that common symptom of inflammation—pain—be rendered apparent, when it would not otherwise be manifested. By this means, and by interrogating the functions of the individual organs, the seat and the character, as well as the degree of disease, will be ascertained.

At present we propose not a detail of all the symptoms and signs by which morbid states are diagnosticated and prognosticated, (this will be done when we come to treat of the individual elements of disease,) but only to indicate, in a general manner, their nature, and the modes of employing them, in arriving at a knowledge of disease.

The prognosis — the foretelling of the result of any given disease, of course depends on the character of the symptoms and signs which it presents, slight departures from

the natural action of the organs, indicating slight changes in their structure, and consequently but little danger to life, and vice versa.

It is almost unnecessary to remark, that, with all the light afforded by semiology, the physician will often find it difficult to arrive at satisfactory conclusions in regard to individual pathological combinations of the morbid elements, and that in such cases no conscientious practitioner will leave unemployed any means of elucidating a subject so interesting and involving so much responsibility. With all our lights, we are doomed often to grope in darkness; with all our means of investigation, we find ourselves frequently compelled to commence the treatment of disease, relying on the effects of the remedies themselves, to shed further light upon its nature. It was Hippocrates, we believe, who said, "*Naturam morborum curationes ostendunt.*" And where is the practitioner who has not found out, by the effects of his treatment, that he had mistaken the nature of the case? In the majority of cases, we would fain trust that the result of the treatment has confirmed the physician as to the correctness of his first view. Be this as it may, the first remedies employed, in individual cases of disease, are of immense value in settling the question of diagnosis. The rule is, in difficult cases, to commence their use on an hypothesis drawn from a close investigation of *all* the *symptoms* and *signs*, and afterwards steer (to use a nautical phrase) according to the "*new lights*" afforded by the results of the treatment.

If it be true that disease, properly so called, consists *in*

limine, of some change in the distribution or quality of the blood — if it be true that as long as the system, or any one of its organs, is supplied with blood, of normal quantity and quality, life and health will be the results in that system or that organ, it follows that death, as well as the phenomena of disease, is but a result of these quantitative and qualitative changes of the blood. The modes in which death may be produced are various, but they all produce this effect, without which death could not take place, viz: a certain alteration in the quality of the blood, called *necremia*. When an animal is bled to death, it is merely *somatic* death—death of the body that is produced: respiration ceases, the heart ceases to pulsate, sensibility and volition are abolished, but the *molecules* of the tissues are not yet dead; there is yet a considerable amount of blood left, and until this residue of the vital fluid undergoes an important qualitative mutation, these animal atoms live — general nutrition and secretion go on, just as the leaves do not wither as soon as the tree is cut down; but carry on their functions until the sap is either, exhausted, or in a state exactly analogous to *necremia*.

This necremia, or death of the blood, is induced by various and complicated modes. In cerebral congestion or apoplexy, the breathing is materially interfered with. This imperfect respiration leads to a dark carbonaceous state of the blood, which, reacting on the brain and other organs, tends still farther to embarrass respiration. This latter function gradually comes to a stand, the heart ceases to beat, and the blood, almost incapable of keeping up the least degree of molecular life, very soon is reduced to a

state of complete *necremia*. Such is death by *coma*, or beginning at the head. When the medulla oblongata is injured either by disease or violence to a degree incompatible with its function, the respiratory movements cease immediately. The life of the molecules is yet perfect, though respiration has ceased; but in a very short time the arterial blood in contact with them is changed to venous; nutrition and secretion cease as consequences. The blood is dead — there is *necremia*. This is death by *paralysis*.

When inflammation attacks both lungs, respiration becomes labored and imperfect — the oxygenation of the blood is interfered with, and soon this fluid becomes incapable of nourishing and vitalizing the tissues. If the heart cease to act, and the organs cease to perform their special functions, before the blood is entirely incapable of keeping up a low degree of molecular life, this latter soon follows, perfect necremia results in a few minutes, when the circulation of blood, almost dead, is brought to a stand. This is death by *apnea*, or commencing in the lungs. Drowning and strangulation furnish examples of the same mode of dying, as also laryngitis, tracheitis, &c. Sudden losses of blood check the action of the heart, and if it does not soon react, the blood will undergo a metamorphosis in the tissues, which will deprive it of its life-giving power. It will die, that is, *necremia* will result. This is death by *anemia* or oligemia. As in this case, it is probable that the heart is the first organ to fail, this mode of death may be regarded as including also death by *syncope*. Certain agents seem to spend their action entirely on the heart, and check its action without directly affecting other or-

gans. Here we have death by syncope alone — the action of the heart ceasing, death of the tissues takes place as soon as the blood can be changed by them to the state of *necremia*.

Exhausting diseases act just as hemorrhagies, except more slowly; the heart may be the first organ checked, but all the organs cease acting almost simultaneously — and the little blood which is left in the system soon arrives at the state of necremia. This has been called death by *asthenia*, or weakness, but it would be more proper to consider it a variety of death by *anemia*, for it is this which causes the *asthenia*.

In some cases, the disease which ends in death consists essentially of diseased blood, and death commences by a partial necremia — that is to say, the fountain of life is tainted in the beginning, and this deterioration increases until the vital fluid is no longer capable of nourishing the tissues. — This has been, properly enough, called death by *necremia*, or beginning in the blood. Febrile diseases, and cases of poisoning, in which there is absorption of the deleterious agent, afford examples of this kind of death. In these cases, the action of the heart, the lungs and the brain, seems to cease simultaneously with the general functions of nutrition; and it is in such cases that decomposition of the tissues appears, in some cases, to commence even before the last tremor of the central organ of the circulation.

Such are the modes of death, simply considered; and it is seen that, however they may commence, the end is the same — *necremia*. But in general, death does not take

place by one of the above mentioned modes alone. We have already noticed that it may commence by *anemia*, which may cause syncope, which brings the blood to a stand, when it soon undergoes that change called *necremia*. This is death by *anemia* and *syncope*. Or it may commence by a certain deterioration of the blood, as in typhus fever. This may lead to abolition of the functions of the brain, which impedes respiration. This is death by *necremia*, or rather *cachemia* and *coma* combined. Other complications will occur to the mind of the thoughtful reader, and he, who does not think, may not exactly comprehend what has already been said on the subject. We repeat, that it is clear, that, however disease may commence, it can end in death only by producing a certain deterioration of the blood, incompatible with life, and therefore properly termed *necremia* — (*necros* dead—*aima*, blood.) All the authors, whom we have consulted, say that all the modes of death end by bringing the circulation to a stand; but it is clear that in many cases life exists in the tissues and molecules after the heart is brought to a stand. There is *molecular* life though *somatic* death has taken place, and these are the cases in which the system is capable of revivification — the cause of death has suddenly arrested the respiration and the circulation, the blood being healthy. By artificial respiration and other means, the whole apparatus may be again brought into action, and the subject raised, as it were, from the dead.— Such examples are afforded by cases of drowning, hanging, the breathing of mephitic gases, &c., &c. But no one thinks of attempting to revive a person dead of typhus fe-

ver. The blood is dead, and no human aid can avail any thing; for *molecular* as well as *somatic* death has taken place, and it is only in a few cases of the latter that the play of the organs can be brought into action, when they have once ceased, for even a few minutes. To go into a minute account of all the complicated modes, in which death is brought about, would be to detail the progress and termination of all the various classes of disease, a task alike unnecessary and incompatible with the plan upon which these outlines are conceived.

Disease, that is, certain changes in the distribution and quality of blood, leading to changes of the solids, is *death commenced* — a certain profound and immedicable change in the quality of the blood, rendering it incapable of the nutritive act, is *death consummated*. We will close the present chapter by a brief notice of the means by which, in many instances, this latter state may be prevented — by which the states leading to it may be remedied — in other words, by considering the modes in which curative agents produce their effects.

The action of remedies is exactly the same as that of morbific causes. This will be evident, when it is considered that every agency that can effect the system may be a cause of, or a remedy *for* disease, according to the circumstances under which it operates.

The causes which produce plethora, and lead to apoplexy, are remedial agents when, brought to bear in a case of anemia. The loss of blood, or the privation of food, long continued, causes anemia and its train of symptoms; but the loss of blood and a low diet are the

best means of remedying the opposite state. In relieving local congestion, the principal element of most diseases in their incipiency, counter irritation is excited in less important parts, for the purpose of causing a determination of blood *to* them, and consequently *from* the organ congested — the irritant, that causes the congestion, and the counter-irritant, that relieves it, both act in precisely the same manner.

If remedies act in the same manner as the causes of disease, they act by causing *certain* changes in the quantity and quality of the blood, and the indications presented by every individual malady are, 1st, to increase the general amount of blood; 2d, to diminish it; 3d, to change its local determinations; or 4th, to alter its quality. These indications, single or combined, are observed in all diseases. The lesions of the solids, which result from these previous changes in the nutritive fluid, are, themselves, capable of being remedied only by attending to the above indications; atrophy, by increasing the amount of blood in the part — hypertrophy, by the opposite course, and depraved deposits checked or cured by producing changes in the quality of the blood.

It is true that it is difficult, in many cases, to say how a remedy acts, and it is given empirically, because accident has manifested its virtues in similar cases; and yet we think that in all such cases, it may be safely concluded that the article in question acts either as a revulsive, or enters the circulation, and by changing it, affects the solids generally. How such medicines act after they are absorbed, or, indeed, how an irri-

tant causes irritation, is yet more difficult of explanation.

Our first indication is met by the tonic regimen and remedies, by which the amount of blood is increased — the second, by the antiphlogistic regimen and remedies — the third by the various revulsives, blistering, purging, &c., and the fourth mainly by exciting the various emunctories, by which morbific matters are eliminated.

Very frequently two or more of these indications exist in the same case. There may be too little blood, and that of a bad quality — then tonics and stimulants, as well as medicines to neutralize or cause the elimination of morbific matters, will be necessary. Some times there exist local congestions with cachemia — then revulsives, even local bleeding, may be called for. Again — there may be intense congestion of an organ, with a superabundance of blood generally — or at least too much generally to be compatible with the relief of the organ; here general depletion as well as revulsion will be demanded. Often there exists lesion of the solids, as well as one or more of these changes in the fluids; but, as already remarked, such lesion can be reached only by regulating the state of the fluids, of which they are consequences. Such diseases are generally chronic, and frequently incurable.

Our fourth indication is involved in great obscurity, and is hardly ever met *directly*. We know, as yet, very little in regard to the qualitative changes of the blood in the essential fevers. It is fortunate for both, physician and patient, that in these diseases the system will, in most

cases, relieve itself — that Nature is adequate to the cure. To say that the system is so organized and constituted that morbid impressions made on it give rise to a series of actions, which result in its restoration to health, is but to assert the same fact in different words. — Nature seems to effect the cure in these cases mainly by the different emunctories, the skin, the kidneys, the liver, &c. How the blood is purified by the action of these organs, it is difficult to explain. Many substances have the power of exciting these organs, and hence, perhaps, their only utility in the treatment of essential fever. We have found such means more successful than any others in the treatment of typhus and typhoid fever. We gave mild diaphoretics and diuretics, and unless either congestion of some important organ, or great debility supervened, we gave nothing more. When such states did supervene, they furnished indications for revulsives on the one hand, or tonics and stimulants on the other. It is clear, that in the present state of science, the physician cannot cure a fever by *directly* altering the state of the system — by neutralizing, as it were, the morbid state or matter, because he does not know what this state is. Nature herself sets the system to rights, by her own inimitable chemistry. The business of the physician is to look on, and be prepared to assist her by stimulants and tonics when strength seems to fail, and to guard against local determinations, which might prove destructive to individual parts and organs, and through them lead to death by some of the modes already alluded to. The blind and almost indiscriminate administration of drugs in

essential fever has caused the death of thousands, whom unaided Nature would have cured.

It is strange that any observant physician should ever have denied the curative power of Nature, a fact so well established that nothing, we could advance, is needed to prove it. The homœopathists would have had the merit of establishing it triumphantly, if it had not been already well established, when Hahnemann commenced dreaming about therapeutic philosophy. That Nature cures disease, even when interfered with and crippled by the ignorant and unprincipled, has been established beyond the possibility of a doubt, by a host of nostrum venders, whose manifestos are a disgrace to the public Press, and whose support is the sacrifice of the health and the lives of a suffering and credulous world.

What we have said of remedies and their action is sufficient to show that they are not *remedies per se*, any more than morbific agents are morbific *per se* — that every thing depends on the circumstances under which they are administered.

No one, who is accustomed to thinking on the subject, will hesitate to subscribe to the saying of an old medical writer: "*Nullum remedium in morbis cognovi quin solo tempestivo usu fiat tale.*"

CHAPTER V.

ELEMENTS OF DISEASE.

We proceed now to treat, in detail, of the various elementary states of the system, which, single or combined, constitue those *conditions* called diseases. It is, strictly speaking, impossible for the system to be affected with but one element of disease; — for *congestion* in one part, causes a degree of anemia in other parts. General anemia consists in altered *quality* as well as diminished *quantity* of the blood. Inflammation of one organ is attended by increase of the fibrin of the blood throughout the system; — nevertheless, disease, as it presents itself in the animal *machine*, may present but one element worthy of attention; for example, a slight inflammation of the eye, though, on account of the importance of the part affected, deserving the promptest attention, will cause no *appreciable* change in any other organ or in the blood.

We shall reproduce here, in an abridged form, what we adanced in our second chapter, regarding the classification of the elements of disease. The following table will, perhaps, suffice.

- 1st. Changes in the quantity of the blood (lesions of circulation. Andral.)
  - General..
    - Hyperemia or Plethora.
    - Anemia.
  - Local....
    - Hyperemia. — Active. / Passive.
    - Anemia.
- 2d. Changes in the quality of the blood, (lesions of the blood. Andral.)
  - A. By the variations of its proximate elements—as fibrin, albumen, &c.
  - B. By the retention of matters destined for secretion, &c.
  - C. By the introduction of foreign matters, as the miasms, &c.
- 3d. Changes in the solids, consequent on the foregoing, (lesions of nutrition. Andral.)
  - A. Increased nutrition, (hypertrophy.)
  - B. Decreased nutrition, (atrophy.)
  - C. Perverted nutrition, including all other changes to which the solids are liable, as tubercle, malignant growths, &c.

Following the order just stated, we take up,

General hyperemia, or *plethora*. It is not probable that the general amount of the blood is often increased to that degree which would entitle it to the appellation, *disease*. Most generally, before this degree is arrived at, some one organ suffers *congestion*, and a *local*, instead of a *general*, hyperemia constitutes the important element of the disease. Thus, in persons full of blood, congestion of the brain (apoplexy) is apt to supervene. In this case, the apoplexy may be said to be a *secondary* disease, and the general hyperemia the *primary*, or this latter might be

termed merely a *predisposition*. It matters but little what names are used, if they but convey clear ideas of things.

The *causes* of plethora are over-feeding conjoined with insufficient exercise and tardy secretions.

Without the conjunction of these two latter, high living is not apt to cause plethora, for it is clear that exercise and secretion rapidly expend the blood — hence the amount of nutritive material, which would lead to hyperemia and apoplexy in a sedentary person, would be even necessary to the health of that same person, engaged in active bodily exercise.

The loss of a limb sometimes occasions plethora, on the same principle. There is diminution of exercise and of parts to be supplied with blood. Plethora has been divided into *active* and *passive*—the former occurring mostly in young persons, or those of middle age; the latter in the old. In the former, there is less departure from health in the blood itself, than in the latter — in other words, the *quality* of the blood is better in the former than in the latter — and as a consequence, the solids themselves, in the latter, are less healthy, and exhibit less tone and vital activity than in the former. The former may, and often does, as age advances, terminate in the latter.

The symptoms and signs of plethora, whether active or passive, sthenic or asthenic, are plain. The face is red, the veins full, the cheeks often present plexuses of small distended blood vessels — in a word, we can see the vascular fulness. The functions are variously changed, the pulse is full — there is a disposition to sleep, and an indisposition to exercise. The secretions are generally in-

active, though sometimes the reverse, depending on the degree to which the organs are congested. Hemorrhagy sometimes occurs, and when not in the tissues of an important organ, it is well for the system, as apoplexy and other grave consequences are prevented.

The description here given applies rather to the *sthenic* than the *asthenic* form of plethora. In the latter, the face is rather purple than red; there is a bloated appearance of the tissues, in which, and in the blood itself, there is a lower degree of vitality than in the sthenic variety. The functions are more sluggish and lethargic in the asthenic, in which it appears, that the plethora is more confined to the veins than it is in the *active* form of hyperemia.

In the passive variety of the affection, the tendency to hemorrhagy is increased, a varicose condition of the blood vessels is common, and dropsies are not unfrequent. The state of things here sketched is often observed in old drunkards.

In plethora, whether active or passive, the mere increase in the quantity of the blood, is not the only morbid element. There is also change in the *quality* of that fluid, consisting in an increase in the amount of the red globules relatively to the other constituents. The normal proportion of these constituents, according to Lecanu, Andral and Gavaret, are as follows :

Red globules,	127
Albumen,	72
Fibrin,	3
Salts,	8
Water,	790
	1000

In plethora, the amount of globules is increased to 154 or even to 180 parts in the 1,000. This condition of the blood favors the tendency to hemorrhagy, occasioned by vascular fulness.

The *remedial* measures for this pathological condition have already been indicated in the enumeration of its causes. The amount of food taken must be lessened, and the amount of demand for blood increased by exercise and the exciting of the secretions. Of course, it is easy enough to reduce plethora by the lancet; but to reduce it gradually, and prevent its return, is the object of the physician — and to do this, a proper regulation of diet and exercise is the principal means to be employed. It is not to be denied that it is difficult to induce those whose chief enjoyment is '*high living*' to abandon it, or to take sufficient exercise; but in such cases, an occasional bleeding will prevent that degree of the malady which might prove suddenly injurious to any organ. In the asthenic variety of these diseases, tonics are generally necessary as well as depletives. It is not sufficient merely to empty the vessels — they have not sufficient life and tonicity to contract when emptied, so that in such cases, antiphlogistics and tonics are not incompatible. The former diminish the amount of fluids distending the vessels — the latter improve the quality of those fluids, and afford to the vessels themselves sufficient tone to contract upon and circulate them. Doubtless it is thus that venesection and tonics act in congestive fever, in which their conjoined use has been found of such signal service. The astringent tonics are preferable in those cases to those

which act more directly on the constitution of the blood. We think highly of the muriated tincture of iron in cases of plethora, as calculated to change the quality of the blood, and at the same time, by its astringency, to afford tone to the vessels. Such medicines, being slow in their operation, must be continued a long time to be of much service. In this busy and enterprising country, the physician is not often troubled with the treatment of general hyperemia. Activity of brain or of muscle, or both, either consume all the blood that the best stomach can manufacture, or impair digestion, and thus prevent its superabundant elaboration. We much oftener meet with general anemia, of which we next proceed to give an account.

Anemia, or a diminution in the general amount of blood, to a degree to interfere with the functions, is, as we have just hinted, a disease of frequent occurrence. Its pathology also illustrates the principle frequently alluded to, that diseases are composed of at least two elements; for there is in anemia an alteration in the quality of the blood, as well as its quantity. There is a diminution of the relative amount of red globules from 127 in the 1,000, to even 28 in some cases, the fibrin and albumen remaining in about their normal proportions. In these cases, the vessels sometimes become quite distended with water, especially if the disease has been suddenly induced, and constitute a state which has been called hydro-anemia or hydremia. The vessels generally, however, soon deposit the water, and thus give rise to dropsy in some of its forms.

The *causes* of anemia or oligemia (oligos — little — aima — blood) are whatever interferes with the function of digestion or increases the secretions. The remedies for plethora are the causes of anemia, and vice versa — thus illustrating the law that the various agents which influence the system are therapeutic or morbific, according to the circumstances under which they are brought to act upon it.

The *symptoms* and *signs* of anemia are, for the most part, plain and easily accounted for. The blood gives the face and tissues their color. In anemia, they are, of course, pale. The blood enables the organs to perform their functions healthily. In anemia, the functions languish — the pulse is weak, digestion is imperfect, and the muscles are incapable of exertion. There are, however, occasionally certain symptoms or changes of function, which, at first sight, are not so easily accounted for. We allude to the neuralgias and other nervous phenomena, which are caused by anemia. How is it that a diminution in the amount of the vital fluid causes an exaltation of some of the functions?

Perhaps in this way: as the blood diminishes in amount, the vessels contract so as to adapt themselves to it; but this faculty is not enjoyed by the vessels of the brain and the spinal marrow to as great a degree as by those of other organs — moreover, atmospheric pressure cannot act upon the brain and spinal marrow as upon other parts; and hence there may be congestion of these organs, though other parts be comparatively destitute of blood. We, by no means, subscribe to the doctrine ad-

vanced by Kellie and endorsed by Abercrombie, that the amount of blood in the brain never varies, but we think that, for the reasons just mentioned, the brain may be subject to congestion, even in general anemia. If the brain were not capable of being slightly reduced in volume by pressure, or of expanding upon the removal of pressure, then, of course, the amount of its blood could not vary, for the skull prevents the influences of atmospheric pressure in the adult. We think that it may be safely stated that the brain is not subject to variations in the amount of its circulation to the same degree as other organs not protected by a bony covering, but that it is subject to these variations, to a considerable degree, has been satisfactorily shown by Dr. Burrows, whose numerous experiments have settled the question beyond doubt or cavil.

Though cerebral congestion may occur in anemia, it is, by no means, the rule that it should do so; and it may be laid down as true that in a majority of cases, there is rather a disposition to faintness and languor of the cerebral functions than the opposite state—there is, generally, mental as well as physical debility. Dr. Williams, in his admirable work on the "*Principles of Medicine*," says, that in anemia there are sometimes clots of fibrine formed in the blood vessels, which clots plug up the vessels of the brain, and thus lead to cerebral congestion, and those phenomena of exalted action to which we have alluded. As a consequence of anemia, nutrition is arrested, and emaciation results. Chlorosis is but the anemia of females. It is generally attended with amenorrhea. Anemia frequently results

from long continued intermittent fever. The Hospitals of St. Louis are crowded every winter by those who have suffered during the previous summer with intermittent fever. They are generally anemic to the last degree compatible with the tolerable exercise of the functions — the spleen is often found enlarged and indurated, and the legs œdematous. This state of things is often complicated with irritation of the mucous membrane of the stomach and bowels, preventing digestion and causing an obstinate diarrhœa.

The *treatment* of anemia is not difficult, when no other element of disease exists which contra-indicates the use of nourishing food and tonics. The preparations of iron and an animal diet, with stimuli proportioned to the irritability or rather excitability of the stomach, are the means to be employed. To these, the cold shower bath may be added with great benefit, as a general rule, though the mode of its operation is not so easily explained as that of iron and nourishing food.

We have just alluded to certain contra-indications to this very rational treatment; the most important of these is, probably, a degree of inflammation of the mucous membrane of the prima via. Such a condition will not only prevent the digestion and absorption of nutritive materials, but become aggravated by their employment, and lead to obstinate diarrhœas, which still further reduce the amount of the blood and the strength of the patient. When this state of gastro-enteric irritation complicates anemia, the first indication is to reduce it by mucilaginous drinks, revulsives, &c., and

then resort to the means already indicated for the increase of the blood. It will be often found necessary to suspend this sustaining course, and subdue such irritation, which is not unfrequently lighted up by the treatment itself.

As the amount of blood is increased, the pale and cadaverous aspect of the patient is replaced by the hue of health; strength takes the place of debility, and the various and anomalous nervous symptoms — the palpitations, the neuralgias, the paroxysms of hysteria, are dispelled as the mists and fogs of morning before the rising sun; — all these symptoms depended on anemia, and could be relieved only by the removal of it. It stood to them in the relation of *proximate cause*, and its removal became their cure. It is because neuralgia so often depends on this bloodless condition of the system, that the preparations of iron have been found of such signal service in the treatment of this painful malady.

The same principle will be our guide in the treatment of this patholigical element, whatever the mode in which it has been produced, or the states of system with which it may be complicated — whether it has been brought about suddenly, by hemorrhagy or cholera, or slowly by diarrhœa, or an essential fever — and whether complicated with a trivial and easily curable gastric irritation, or an incurable cancer — the treatment of the complications will differ according to their nature; but to cure the anemia, the elements of the blood itself, must be introduced into the vessels.

Local Hyperemia. Of all the elements of disease, this is, without doubt, the most common; so common, indeed, that some pathologist have thought that it embraces the whole domain of pathology. The "irritation" of Broussais, which was, according to him, at least, the principal element of every disease, is but one of the varieties of local hyperemia. Dr. Allison remarks that "there is perhaps, no disease not connected with increased afflux of blood: and that this congestion or afflux of blood is the object of our main remedies." Without subscribing to this statement in its full extent, we may safely assert that local hyperemia is, in a vast majority of cases, present; and that in a large majority of cases, it is the principal element of the disease, and that to which, of course, the efforts of the physician are mainly directed.

Local hyperemia, or congestion, is distinguished into *passive* and *active*. The marks or characteristics of these two forms of congestion, differ widely from each other; and are easily apprehended. *Passive* congestion, as its name implies, is due to some obstruction to the circulation of blood, or to a relaxed condition of its vessels, which permits its stasis in them. The congestion of the veins of the arm, caused by a bandage, as used in venesection, or the congestion of the neck and head, caused by a tight cravat, is an example of the former: and the varicose state of the veins of the legs in debilitated persons and the dilated state of the veins in old and broken down system, are examples of the latter. Indeed it may be said that in all these cases there is obstruction to the

circulation, in the one case by a mechanical damming up of the current, and in the other from a relaxed and atonic state of the vessels.

Passive congestion is mainly confined to the veins, whereas active congestion is mainly confined to the arteries and arterial capillaries. The former is produced on purely mechanical principles—the latter, on what we may call chemico-vital principles. In the former, the blood is venous, and of course destitute of that vitality or faculty in virtue of which it nourishes the tissues and sustains them in a state of health and activity. It is exhausted blood. In the latter, the blood is arterial, fresh from the lungs, carrying excitement and health in its vivid current. In the former, the affinity between the blood and the tissues is abolished. In the latter, it is in full force; consequently in the former, though there may be effusion of the serum or of the blood itself, constituting dropsy or hemorrhagy, there can be nothing like the vital chemistry of nutrition and the generation of heat and irritability, which characterize the latter. The main distinction, in fine, is, that in the one, the blood is venous, and in the other arterial, be the rationale of its production what it may. It requires but a glance at the anatomy of the animal machine, and the causes which operate on it, to perceive the facility with which this element of disease can be induced.

The *causes* which induce the obstruction to the circulation, to which we have alluded, are various and numerous. *Cold*, acting on the surface, contract the superficial capillaries. Such obstruction produces congestion of some

internal organ or organs. Thus it is that the various diseases of cold and variable seasons are produced; many of which become active congestions or inflammations, on account of the highly oxygenized state of the blood in cold weather. In these cases, indeed, the congestion is as much arterial as venous. *Malaria* induces congestion of the internal organs also, but in a manner not so well understood as that in which it is induced by cold. We may safely say, however, that it weakens the action of the heart and leads to general congestion of the vessels, emptying their contents into its right chambers. The congestion, thus induced, is removed by the heart's own reaction in the hot stage of the fever. This species of congestion is caused, in like manner, in the forming stage of all essential fevers.

Valvular disease of the heart, interfering with the passage of the blood through that organ, causes, also, congestion of all the veins. This congestion is limited for a time to those portions of the venous system unprovided with valves; but in the process of time, the valves give way, and a distended state of these vessels is observed, even in the legs and arms. Diseases of the liver, by which its structure is profoundly altered, as in cirrhosis, obstruct the portal circulation and produce congestion of that portion of the venous system.

We would, a priori, conclude that the *symptoms* of *passive* or venous congestion would consist in a lowering of the properties of the tissues and the functions of the organs in which it exists. Such is, in general, the fact. Congestion of the brain renders the intellect obtuse, and

indisposes to any sort of exertion. Increased to a certain degree, it causes a palsy of all the functions of the brain — apoplexy in a word. Congestion of the lungs produces dyspnea, as observed in the cold stage of the fever. Cardiac asthma, as it has been called, is but a congestion of the lungs, caused by disease in the left orifices of the heart. Congestion of the stomach and bowels causes dyspepsia of the liver, a feeling of weight, and either increased or decreased secretion of bile, according to the degree of the congestion — venous blood being an appropriate stimulus to hepatic secretion.

In the diagnosis of congestion, the negative symptoms and signs are also of great value, as the absence of blood in those parts not the seat of the disease, the *anemia* of some parts occasioned by the congestion of others, as the bloodless state of the skin in a chill, and the debilitated condition of the muscles in cases of internal congestion of long standing and considerable gravity.

When congestion is intense and persistent, it leads to other elements of disease, viz: certain alterations in the solids. This is effected by the effusion of the solid together with the fluid materials of the blood, which materials acquire a low degree of organization in the interstices of the tissues, giving rise to a species of hypertrophy — not true hypertrophy, for there is not an increase of the tissues themselves — but a sort of degeneration of the parts with an increase in their volume from depositions, with which they have no affinity. It is thus, doubtless, that tubercles are produced in

many instances, as also the granular kidney, to which we at present merely allude. Another and a very common effect of congestion, closely analogous to the foregoing, is the effusion of the blood itself, constituting *hemorrhagy*, or of its watery portion, constituting or causing *dropsy*, if in a closed sac, or in the interstices of the tissues, or *flux*, if upon a mucous membrane.

The manner in which congestion causes hemorrhagy, dropsy and flux, is, by no means, difficult of explanation. It is by the mere pressure of the contained fluid upon the yielding muscles, and is effected on the same principle on which water oozes or spouts forth from a piece of over-strained hose. The hemorrhagy, dropsy and flux, caused by passive congestion, are very appropriately called *passive* hemorrhagy, *passive* dropsy, &c., to distinguish them from similar results of *active* congestion and inflammation — an important distinction in a therapeutic point of view. The *treatment* of passive congestion consists in the removal of its causes. This is not at all times and in all cases practicable; that is to say, passive congestion cannot always be cured.

When suddenly caused by cold, the system, in general, will react and thus relieve itself. The physician can, however, aid in bringing about this result by warm applications to the surface, frictions, &c. The same means are appropriate in a chill, and in the forming state of most fevers.

When caused by the pressure of the gravid uterus upon the iliac veins, the recumbent posture and mechanical support to the limbs are indicated — if by a tight

article of dress, as a cravat, it will be removed. But sometimes the obstructions causing the congestion cannot be removed, as when, for example, they consist of the diseased and degenerated valves and orifices of the central organ of the circulation — or of cirrhosis of the liver — or of deep seated tumors pressing upon the veins. In such cases, of course, the congestion is incurable, and in the process of time, it results in the hemorrhagies and dropsies to which we have alluded, which mitigate, it is true, the congestion, by emptying the vessels, but sadly interfere with the functions generally, and sooner or later sink the sufferer to the grave.

Even when it is possible to remove all obstruction to the course of the blood, the vessels, the seat of congestion, invite its stay by their dilated and relaxed state. In such cases, and this is always the case when the disease has been of long standing, it is necessary to afford some support to the vessels. In some instances, as in the limbs and external parts this can be done by mechanical means. Such means are, however, out of the question when the disease is internal. Here we must resort to moderate bleeding, if the system be at all plethoric — to counterirritation, by which the blood will be drawn to other parts, and consequently *from* the congested part; and to tonics, which, entering the current of the circulation, act on the parietes of the congested vessels and impart to them that degree of tone necessary to enable them to propel their contents. It is more than probable that quinine acts in this way, in rapidly reducing the volume of the congested spleen. Arsenic, zinc,

iodine, and the mineral and vegetable tonics in general, are supposed to act in this way; but whatever the rationale of their action may be, these remedies have proved themselves to possess the power of relieving this condition of the vascular system. It must be remembered, however, that in such cases, the use of the remedy should be as *chronic* as the disease; and that it should not be abandoned, because it fails to sensibly improve the condition of the patient in a few days, or even weeks. The dose to be employed should be small and frequently repeated. Doubtless it is by slowly acting on the distended vessels and gradually contracting them, that zinc, nit. silver, &c., have so often proved serviceable in epilepsy and other nervous diseases, dependent upon continued or paroxysmal passive congestion.

We proceed, in the next place, to consider *active* or arterial congestion, and the interesting pathological state to which it directly leads, and of which it is the cause and principal part, namely — *inflammation*.

CHAPTER VI.

ACTIVE CONGESTION — INFLAMMATION.

The principal marks which distinguish *active* from *passive* congestion, have already been noticed. In active congestion, the blood is arterial. It takes place physiologically in all the organs — in the muscles during exercise — the brain during thought and passion — the uterus in gestation — the mammæ in lactation, the stomach in digestion, &c., &c. The blood nourishes the organs and tissues, and stimulates them to the performance of their special functions; but when increased in them beyond a certain degree, it causes notable changes or derangements of their functions, and constitutes disease. We might, a *priori*, conclude, that as arterial blood nourishes the organs and enables them to perform their functions, any increase of it would but increase the activity of these functions. This is true only to a limited extent, beyond which the functions suffer derangement. Leaving conjectures in regard to not well determined laws out of the question —

the physical effects of strong congestion are to distend the vessels, press upon the secreting structures and lead to effusions. In other words, the structure of the organs is deranged by the mere physical effects of congestion, and hence the derangement or even suspension of their action when the seat of intense congestion, whether active or passive.

There is every grade of active congestion, from that which scarcely exceeds the normal amount of blood in a part, up to that which gives rise to effusion, suppuration and gangrene. When the congestion is suddenly induced and intense, the minute vessels occasionally give way, and there is an effusion of blood, or this effusion may result from the dilatation of the vessels and tissues of the part. This is *active hemorrhage.* Sometimes depending on the degree of the congestion and the character of the vessels, only the serous portion of the blood is effused. This effusion, if on a mucus membrane, constitutes a flux; if within a closed sac, a dropsy; *active flux — active dropsy.* To these important results of congestion, active and passive, a future chapter will be devoted. A much more frequent result of active congestion is the increase of the amount of colorless or lymph globules in the part, the clogging of these in the vessels by which the circulation in them is checked; and the effusion of the plastic lymph. When *active congestion* has proceeded to this degree, it constitutes with its effects what is called *inflammation;* which may proceed to suppuration, or the conversion of the effused lymph into pus — to ulceration or a gradual destruction of the part — to mortification; or

merely to the organization of the effused material in the tissues of the part affected.

These results of inflammation have been termed *terminations*, but evidently inflammation can *terminate* only in *resolution*, or a restoration to perfect health — in the organization of the effused matter, or in the death of the part — mortification. Indeed it is questionable whether mortification should be considered a *termination;* for, though the disease has terminated in the tissue mortified, it exists still in the adjoining structures, and is the agent by which the breach of continuity occasioned by the mortification is repaired — that is to say, the *termination* is by *organization.* It is probably unfortunate for science that the term *inflammation* has been so generally employed. It is but *active* congestion with some of its results; and its limits are difficult to define, and not well agreed upon by pathologists. It seems, however, to be generally admitted that when the congestion or arterial blood has existed long enough to cause the clogging of some of the vessels by the lymph globules, together with their effusion or extra vascular formation, *then*, that state of the part exists termed inflammation — that is, pathologists have agreed to call it inflammation. Of course, the passage of congestion into inflammation, is by imperceptible degrees; there is no hiatus between them. That the phenomena of the formation of the lymph globules in the vessels and the arrest of the circulation in those vessels in which they are most numerous, have presented themselves to microscopic observers, is well sustained by numerous and high authorities.

Dr. Williams (Principle of Medicine,) suggests the plausible explanation of the production of these globules; that the rush of the red globules to the parts, oxydizes the nutritive lymph, and thus converts it into these colorless globules which are the agents of nutrition and reparation, the protoxid of protein being converted into the deutoxid — the red globules being carriers of oxygen. Be this as it may, it is well known that in young animals, in which the process of nutrition is active, the blood is richer in those colorless globules than it is in old or mature animals, in which this process is less active; and it is well known, also, that the blood in inflammatory diseases shows an increase of this same nutritive element. It is evident from these facts, that the inflammatory state is that of *excessive and perverted nutrition*. This view harmonizes well with the fact that inflammation is necessary to the cure of every solution of continuity in the structure caused by accident or the knife of the surgeon, and that its tendency in all cases is to relieve the system of something which is injurious to it; but as an individual in exerting himself to escape death, may, by his very excess of action, bring about the fate he flies, — so inflammation, the tendency of which is to relieve the system, often by its excess causes destruction and death. Like the healthy functions, it tends, at the same time, to life and to death.

The *causes* of active congestion and inflammation are whatever interferes with the action of the capillary vessels. Cold, by constricting the vessels of the periphery, causes congestion of the internal organs, which often

passes rapidly to that condition termed inflammation. But in, perhaps, the majority of cases, active congestion and inflammation are induced by stimulants, "*ubi stimulus ibi affluxus.*" The application of an irritant seems at first to cause, like cold, the contraction of the capillaries of the part; but this state of contraction is soon followed by the dilatation of the vessel, and consequent congestion. That such is the modus agendi of irritants, microscopic observations have pretty well established.

It would appear that the vessels are stimulated to excessive action, by which their contractive power is, after a time, exhausted, and that then dilatation is the result of this exhaustion.

That increassd action, induced in any organ or part, leads to subsequent exhaustion or debility, is a well established fact. The notion of a debilitated state of the vessels in inflammation was put forward more than a quarter of a century ago, by Professor Cooke.

Substances, capable of irritating the tissues, act not only on the skin and mucus surfaces, but often exist in the blood itself, and cause inflammation in the organs by which they are eliminated. In this way, it is more than probable that inflammation supervenes on the essential fevers; and that the cutaneous phlogoses of the small pox, scarlatina, erysipelas, &c., are produced. It has been suggested that the inflammation of the glands of Peyer, as observed in typhoid fever, results from the irritating *materies morbi*, which it is the office of these glands to cast off. Rheumatism and gout are evidently

caused by irritating matters in the blood, which matters it is the office of the skin and kidneys to separate from that fluid. Indeed it may be stated, that the retention in the blood of matters destined for secretion or excretion is a fruitful cause of inflammation. Over-exertion of any organ, induces active congestion, which passes often into inflammation. In short, whatever is capable of *driving* or *inviting* arterial blood to a part may become a cause of these pathological states.

The *symptoms* and *signs* of active congestion and inflammation are *local* and *general* or *constitutional.*

Heat, redness, pain and swelling, was the definition of inflammation given by Celsus. All these phenomena are the immediate effects of the congestion — so that this definition or description applies to active congestion as well as inflammation, though in the latter, the phenomena are aggravated. The *redness* is evidently caused by the presence of an increased amount of blood, as also the *heat* — the *pain* is explained by the pressure exercised on the parts. The *swelling* is also due to the congestion, though it is much increased by the effusion, which takes place as the congestion passes into the state termed inflammation.

These phenomena vary a great deal, according to the structures in which the disease is located. In dense fibrous tissues, and in serous membranes, the *swelling* is not so considerable as in the softer and more vascular parts, but the *pain* is greater in the former than the latter. The *heat* and the redness are, of course, most considerable in those parts most richly supplied with blood vessels.

Suppuration, ulceration and gangrene, constitute so many symptoms and signs of the intenser grades of inflammation. The function of the organ or part, the seat of the disease, is interfered with, or even annihilated, according to the degree of the congestion and the extent to which the morbid process is carried. Thus the active congestion, which produces scarcely any derangement of the brain to-day, may increase so as to cause serious disturbance of its functions to-morrow, and pass the next day into inflammation, which may, in a few more days, so injure the structure of the organ as to annihilate its functions.

One of the most common of the general symptoms of these morbid states is fever, (*inflammatory fever*,) which is of the continued type, and the gradual subsidence of which is one of the most favorable symptoms in inflammatory diseases — its persistence indicates, on the contrary, their obstinacy and danger. The symptomatic fever, of course, varies in intensity with the grade and extent of the congestion or inflammation. It varies, also, according to its seat. In pneumonia, for example, the pulse is full and strong, though not very rapid, and the heat of the surface considerable ; but in enteritis the pulse is contracted and rapid, and the heat of the surface often but little increased above the natural standard. What is the rationale of the production of fever in inflammatory disease ? Perhaps no one cause will explain it. The increase in the lymph globules, which is observed to take place in these affections, may be the principal cause — the blood becomes loaded with this

coagulated lymph, this deutoxid of protein, (fibrin,) and as a consequence, more stimulating to the heart. Hence, perhaps, *mainly* the fever. The fever is, doubtless, the cause of the derangement of the functions of all the organs of the body, so generally observed in violent inflammation. The rapidity with which the blood passes through the secreting organs is, at any rate, one of the causes why the secretions are diminished or suspended. There can be no doubt that the circulation of the blood is dependent as well upon the *vital attraction*, which exists between the solids to be nourished and the blood which nourishes them, as upon the action of the heart; both are necessary to the normal circulation of the blood. That there is a sort of attraction between the solids and fluids is proven by the only fact which shows chemical attraction — that is, the solids and fluids *unite*. It is clear that this union takes place in virtue of a certain "*force*" — call it nutritive force, or give it any other name; and that this force aids in effecting the passage of the blood through the capillaries. How else does the circulation in plants take place? or that of the portal circle? — But inflammation is characterized by *excessive and perverted nutrition*. This excessive and perverted nutrition should then increase the rapidity of the circulation through the parts inflamed. The blood being sent more rapidly to the heart may excite it to accelerated action. Such is, perhaps, the main element in the rationale of inflammatory fever.

It is only when inflammation is intense in degree, and considerable in extent, that all or nearly all the pheno-

mena, local and general, to which we have alluded, are present. When it is limited to a small space, and sub-acute or chronic, it often produces scarcely any fever, and hardly interferes with functions of a single organ.

Inflammation is divided into *acute*, *sub-acute* and *chronic*, according to its degree of intensity and the term of its duration; *acute*, when it runs its course rapidly and terminates within two or three weeks; *sub acute*, when slower in its progress; and *chronic*, when it continues longer than six or eight weeks. As these terms are used to express mere variations in the same state, it is impossible to limit them very accurately.

Inflammation may farther be divided into *common* and *specific*.

Common inflammation consists merely of the determination of healthy blood with effusion, suppuration, &c; specific when the result of some morbid poison, introduced into the part, or circulating with the blood; or when supervening upon certain depraved and degenerated states of the blood.

As an example of common inflammation may be mentioned that caused by a wound on a healthy subject, or a suddenly produced pneumonia in a person previously sound. Of specific inflammations, there is an almost endless variety: the *rheumatic*, the *gouty*, the *scrofulous*, the *syphilitic*, the *gonorrheal*, &c., &c., together with the majority of cutaneous diseases. In the same category should be placed the inflammations supervening in typhoid and typhus fever, — for in these fevers, as well as in rheumatism and gout, there is a *materies morbi* in the

blood, which modifies the inflammation. The products of inflammation, the kind of effused matter it leaves in the tissues, vary according to the degree of the disease and the general state of the blood. In *common* inflammation the effusion is capable of a high degree of organization, hence false membranes, cicatrices, &c. When the blood is poor, and its fibrin of an inferior quality, the effusion is incapable of much organization, hence some of the species of tubercle. When the blood is loaded with gouty matter, the products of the inflammation will be mingled with deposits of this matter (the lithates.) In a word, it is but reasonable, from known facts, to conclude that the various changes of the solids, whether *analogous* or *heterologous* to the natural structures, depend on local *hyperemia*, and the various qualitative changes in the blood, with which it may be associated. These changes of the solids will be treated of in detail hereafter.

There is, perhaps, no element of disease equal in importance to *active congestion*. We have seen that it may cause dropsy, and hemorrhage; or pass into the state of inflammation. So important, indeed, is this pathological element, that not a few medical philosophers have thought that disease could not exist without it. The "*Irritation*" of Broussais is but a degree of active congestion or inflammation; and this he regarded as the proximate cause of all febrile diseases. With him, irritation and its results included almost the whole of pathology. They do include a vast portion of it, but there are other primary elements of disease, and the ex-

clusive doctrine of *irritation* was the result of a too hasty and a too extensive generalization. It includes a vast number of facts, but not all of them. Its principles constitute a large portion of pathology, but it should not be suffered, like the rod of Aaron, to swallow up all the rest of the elements of disease.

Treatment of Active Congestion and Inflammation.— We have already alluded to the many varieties and grades of these morbid elements. The possible combinations of these varieties and grades are almost infinite; and yet a few general principles will guide us in their treatment. The indications, in all cases, are to diminish the amount of blood in the part, and to alter that condition of this fluid which favors *hyper-nutrition.* These are the only indications when there is nothing specific in the disease: other indications exist when the scrofulous, the gouty, the rheumatic or any other peculiar morbid diathesis is present. Remedies dictated by reason, or found by experience to be proper in the various specific states, will be employed when they exist, simultaneously with those directed to the hyperemia.

The circumstances of the part affected will considerably modify our treatment, be the variety and degree of the malady what it may. The pathological state, which would be trivial in the little finger, would be a serious affair if located in the retina. Hence, though in the former case scarcely a remedy would be thought necessary, in the latter the most active means would be required; not because of any danger to life, but to preserve the function of vision. Simple active congestion, before

effusion has taken place, may be relieved by the general abstraction of blood, the temporary weakness of the heart's action thus induced permitting the dilated vessels to contract. This is especially the case when fever has supervened.

Next in importance to the general abstraction of blood, is local bleeding, practised as near as possible to the organ affected. Topical bleeding is, indeed, adequate of itself to the relief of most cases of active congestion.

In the third place come counter-irritants or revulsives, — these, by strongly determining the blood to the parts to which they are applied, tend powerfully to relieve the congested organ. Amongst these, active purging is named as one of the most important, operating, as it does, on a large surface, and as a depletive as well as a revulsive. Of course, it could be employed only when the *prima via* is itself free from disease. Dr. Abercrombie says that in congestive diseases of the brain, he has found more benefit from purging than from any other means. He generally, however, prefaced it with a bleeding. We are prepared to believe this; for the extensive congestion of the abdominal viscera, induced by active purging, will necessarily reduce congestion elsewhere. Blister sinapisms, the warm bath, are so many valuable revulsives, which may be brought to the aid of of the means already mentioned, in the reduction of active congestion. It is only when the disease is of considerable extent and intensity, and involves an important organ, that the active employment of all these means is

called for. In inflammation, the symptoms are aggravated, the structure of the organ is still further compromised, and consequently the treatment should be more energetic than in mere congestion.

When acute inflammation has declared itself in an important organ, as the brain, the lungs, the heart, or the serous linings of either of the three great cavities, all the remedies which we have enumerated as indicated in active congestion, are to be employed with increased energy and promptness. The amount of blood to be abstracted in such cases must depend upon the effect produced on the action of the heart and the other symptoms of the disease. The rule laid down by Marshall Hall is a good one, viz: to bleed to approaching syncope. According to this author, the tolerance of bloodletting is greatly increased by inflammatory diseases. Estimating the amount of blood which the system can lose in adults in ordinary health, before symptoms of approaching syncope appear, at about one pint, he goes on to state that in inflammation of the brain, lungs, &c., double that amount will have to be abstracted to produce the same effect, and that in diseases of debility, such as some of the fevers and cholera, syncope will take place before even a half pint of blood is drawn. These are, of course, general rules, subject to many modifying influences; but we feel no hesitation in saying that an *acute* inflammation of any important organ, it is a good and safe practice to bleed to approaching syncope, the patient being in the sitting posture.

What we have said of local bleeding and counter-

irritation, in the treatment of active congestion, applies equally well in the treatment of inflammation. All the difference is one of degree. They should be used still more energetically in the latter than the former.

In inflammation, more than in active congestion, are indicated those means which tend to check the nutritive process. In high grades of inflammation the blood is loaded with fibrin. It would seem that the vital power of nutrition is greatly though morbidly increased; perhaps, as before remarked, by the conversion of the protoxid into the deutoxid of protein.

To reduce the amount of the fibrin (deutoxid) is then an important indication in the treatment of inflammation. This may seem rather speculative, but it is certain that mercurials and the alkalies have the power of diminishing the fibrin, of reducing the plasticity of the blood, of impoverishing that fluid; and it is equally certain that these agents have been found serviceable in treatment of inflammation. This has been proven by observation and experiment. — How these agents effect this change in the blood is not so well known, but it is more than probable that it is by a deoxydizing process — the reduction of the deutoxid of protein to the less stimulating protoxid. Be the rationale what it may, experience has proven the utility of these remedies in inflammatory affections. Nothing is more common than the subsidence of the inflammatory symptoms on the supervention of slight ptyalism. The *diet* and *drink* of the patient may, as a general rule, be regulated by the appetites. There is generally no desire for food; and

intense thirst. Cold water should be freely allowed, and the appetite for food scarcely ever returns before it is proper that it should be indulged.

Such are the main items in the treatment of *acute* inflammation. The same means are to be employed *less actively* in the treatment of the *sub-acute*, and of the chronic; we have already spoken, of the results of long standing inflammation — *analogous* and *heterologous* deposites and formations. Over these, it does not appear that mercury exerts any control. Its action seem to be exerted over the nutritive materials whilst in the blood vessels or but recently effused, causing their reduction and absorption, but powerless against chronic and degraded deposits and structures. Here the preparations of iodine seem to be efficacious, and indeed, it may be laid down as a therapeutic principle, that iodine shou'd be employed in the *chronic* stage of all diseases which require mercurials in their *acute stage*. It evidently promotes the absorption of organized products, over which mercury exerts no beneficial control. Its utility in chronic syphilis and rheumatism is incontestable.

Of the treatment of specific inflammations, we shall only remark, that in addition to the means employed for the element *inflammation* itself, various remedies will be regarded according to the state of the system or part in which the specificity may consist. These remedies are mainly empirical — accident, rather than reason, having led to their employment in the first place; and of their *modus agendi*, little is known. It may however, be laid

down as a general rule, that inflammations supervening on *cachexias*, or what Piorry would term *toxihemia*, cannot be treated actively — that they are necessarily *sub*-acute; and that often the system needs sustaining, in order to be enabled to effect itself through its various emunctories, the expulsion of deleterious matters. We have neglected to mention opium as one of the remedies in the treatment of inflammation. Its power of quieting pain, first lead to its employment; but it seems, in addition to its soothing effect, to exert a direct curative influence. It is advantageously combined with mercurials.

CHAPTER VII.

LOCAL ANEMIA.

This is a frequent, but not a very important element of disease. Occasionally, however, it is the main element, to which, of course, the treatment is principally directed. Whenever congestion of considerable extent and intensity exists, anemia must necessarily be present also; for congestion in one part of the organ of the system can take place only at the expense of other parts and organs.

During the cold stage of intermittent fever, there is congestion or hyperemia of some of the internal organs — other portions of the system are necessarily in a state of anemia. The contracted and shrivelled appearance of the skin, under such circumstances, is occasioned by the re-cession of the blood — in other words, by anemia. This condition of the surface of the body is observed in the incipiency of all inflammatory diseases; and throughout the course of all such diseases, local anemia, to some degree, must of necessity exist.

The reason is obvious: — the system, in a state of

health, has a normal amount of blood for its organs; but in congestive diseases, some organs are over-gorged with blood, therefore others are left in a state of comparative *anemia*. It is true, that in such cases the anemia is often very slight, too slight to interfere *notably* with the functions of the organs; and according to our definition of disease too slight to merit the appellation, *morbid*: nevertheless, in many of such cases, the anemia, as well as the congestion, exists in a degree which does *notably* alter the functions; and in all cases, though it may not constitute a principal or even very important morbid element, it should be duly attended to by the physician, as by correcting it, he will relieve the congested organ. By the warm bath, for example, which relieves the constricted and anemic condition of the periphery, congestion of the central organs is necessarily diminished, if not entirely removed. In a given malady, not the principal element alone should be considered, but all should be noted and weighed. He who sees in the system laboring under pneumonia, only a disease of the lungs, is not likely to treat it so well as he who takes into consideration also the partially anemic state of the periphery, — a consideration which would immediately lead to the employment of such means as are capable of determining a flow of blood to the surface. Thus it is that the warm bath relieves incipient diseases, and substitutes the feelings and the physiognomy of health for the general malaise and dejected looks, prelusive of developed maladies. These views would appear too obvious to require even a remark; but we are of opinion that they are often

entirely overlooked, merely because they are so obvious.

Sometimes, as we have already said, local anemia constitutes the principal element of disease.

Anemia of the brain gives rise to the phenomena of syncope, and doubtless also to many symptoms commonly denominated *nervous*. The pallid features and the almost imperceptible pulse sufficiently indicate this state of the brain.

Anemia of the brain gives rise to symptoms resembling, in some degree, those of cerebral congestion. This latter suspends partially or totally the functions of the organ, perhaps mainly by pressure; and the former diminishes the same functions, on the simple and plain principle that the presence of a certain amount of blood is necessary to these functions. To diminish the amount of blood is, of course, to weaken them.

Dr. Gooch mentions several cases in which this anemic state of the brain was thought to be hydrocephalus, and treated as such, to the great injury of the little patients. He also bears testimony to the utility of stimulating in these cases of what he calls pseudo-hydrocephalus. The weak pulse, the pallor, the emaciated condition of the child, and the depressed fontanelle sufficiently distinguish these cases from those of veritable hydrocephalus, and hyperemia of the brain.

Local anemia is generally a secondary disease, the result of some foregoing malady. Thus the muscles be-

come anemic, and consequently atrophied, as a result of palsy, which is of itself but a symptom of some previous disease. Inflammation in a principal vessel of a part may lead to its obliteration, and thus render such part anemic.

Pressure, as by a bandage, reduces the amount of blood in the parts to which it is applied — in other words, induces anemia, and that primarily. Hence the utility of the roller in the hyperemic state of any organ or part, to which it can be applied.

We have incidentally sufficiently indicated the *causes*, the symptoms and the treatment of this morbid element.

We proceed to the consideration of the qualitative changes of the blood, — and

First, *of those which consist in the inequilibrium of its constituents.*

In a previous chapter, we stated from Andral and Gavarret the amount of the proximate elements of the blood relatively to each other. These relations are frequently changed. The *red globules*, the *fibrine*, the *albumen*, the *salts* and the *water* of the blood often become relatively increased, or diminished. We will notice some of these changes in detail.

Increase of the red globules.—This element of disease never occurs alone; and consequently it has been studied only in connection with other elements. To give a history of its *course*, *symptoms* and *treatment*, would be but to repeat what has already been said, under the head of general hyperemia or plethora, with which it is almost always associated.

Decrease of the red globules. This change in the quality of the blood always accompanies general anemia, of which we have already treated. We have mentioned that the proportion of *red globules* is sometimes reduced to twenty-eight in a thousand. Andral mentions the case of a woman, who had suffered greatly from uterine hemorrhage, in which they were reduced to twenty-one, and to which the water of the blood had risen to the enormous proportion of nine hundred and fifteen. The fibrin of the blood in anemia not being decreased, but in comparison with the red globules relatively increased, explains the firm clot and buffy coat of the drawn blood of persons subject to this and its cognate elements of disease. Andral has noticed certain alterations in the structures of the globules in those cases, in which they are proportionally diminished. He mentions that in two cases of chlorosis, the globules appeared smaller than natural; and that many of them seemed broken into fragments. We refer to what has been said of general anemia, for all that is necessary to be remarked relative to the causes and treatment of the *deficiency of red globules.*

The *fibrin* of the blood is increased in all diseases of hyper-nutrition. Whenever it is increased to about six or seven in a thousand the functions will be notably disturbed. Fever will generally be present. The increase of fibrin is an invariable accompaniment of inflammation. We have already noticed that it forms the buffy coat of the clot. Andral asserts that in eighteen hundred bleedings, in which he examined the blood, he

never found the buffy coat except in cases of inflammation and anemia. We have stated why it appears in the latter state.

As the fibrin is abnormally increased relatively to all the rest of the elements of the blood only in inflammatory diseases, — those congestions with a tendency to new production, as Meckel calls them, — we may refer to what we have said under the head of inflammation, for the *causes*, *symptoms* and *treatment* of this change in the blood.

The fibrin is diminished in those various conditions of the system which produce the phenomena of the essential fevers. In the graver forms of typhus fever, Andral has found it reduced to one in a thousand. The fact, that the fibrin of the blood is always diminished in these fevers, proves beyond a doubt that they are not symptomatic of inflammation, as Broussais taught and many pathologists yet believe. It is true, that in some cases of the essential fevers there is no diminution of the fibrin, or rather it should be said, no easily appreciable diminution; but these are the slighter cases. The worst cases are those in which the diminution is most considerable. The contrary should be true, if these fevers were symptomatic of inflammation. It is also to be remarked and admitted, that occasionally the fibrin is increased in typhus, typhoid and other essential fevers; but this is only when inflammation of some intensity has supervened.

It would seem that the cause of these fevers operates directly on the fibrin of the blood, lowering its vitality

and diminishing its contractile power. From some experiments of Andral, it would appear that pus, which has undergone a sort of decomposition, is capable, when absorbed, of producing this dissolved *debrinated* state of the blood; and Magendie produced phenomena in animals analogous to those of typhus fever, by injecting into their veins, putrid animal matters. It is easy to deny, and even to disprove that inflammation is the cause of these fevers, but very difficult, nay, impossible, in the present state of science to say in what their pathology does consist. The mere diminution of fibrin may be said to be a part of the pathology of these fevers; but it evidently does not constitute their essence. To give their entire pathology, it would be necessary to state the nature of the poison, all the changes which it induces in the blood, and all the changes which result in the solids. Only the last part of the task has been as yet accomplished. Some little progress has been made in the second part. It has been shown, at any rate, that the fibrin is diminished — and may we not hope that the time is not far distant when Nature, "because of the importunity" of her votaries, may yield to them the secrets of the first?

In all the morbid states of the system, of which a diminution in the fibrin of the blood constitutes a part, there will be a tendency to hemorrhage.

This tendency may be explained by the fact that the solids, failing to receive their ordinary material for reparation, become lax, and thus more readily admit the effusion of blood; by the condition of the blood itself,

and by the fact proven by Magendie, that this and similar alterations in the quality of the blood incapacitate it for passing readily through the capillaries, and thus favor congestion. This hemorrhagic tendency is observed in scurvy and the essential fevers, and is evidently mainly attributable to the diminution of the fibrin of the blood.

To state the *causes* of the alteration in question would be to discuss as fully as possible — the etiology of the pyrexia. We shall have occasion to speak of these causes hereafter, when on the subject of our third category, that of qualitative changes of the blood.

We would, *a priori*, conclude that a defibrinated condition of the blood, would give rise to general debility. That the adynamic symptoms of the essential fevers are mainly caused by this element of disease, it would not be unreasonable to conjecture. The treatment required by this *element* of disease consists in the liberal administration of tonics and stimulants, and as much nourishing food as the appetite craves and the stomach can digest. Such, indeed, is the treatment found to succeed best in the low adynamic forms of typhus fever. It is true that the element of which we speak, is often associated with other morbid elements, which contra-indicate the above treatment. May not blistering be of service in typhoid diseases, by exciting inflammation of the skin, and thus increasing the fibrin of the blood? We have prescribed them under this hypothesis, and we think with advantage.

The *albumen* of the blood is rarely increased or dimi-

nished, relatively to its other constituents. It is said to be notably diminished in the morbus brightii. The rationale is plain; it is drained off by the kidneys, and is found in the urine.

The *water* of the blood is frequently varied. It is increased relatively to the other constituents, as we have already remarked in some cases of general anemia. The vessels being suddenly emptied of their blood absorb more actively in consequence, and thus induce a sort of *aqueous plethora*.

The watery portion of the blood is diminished in cholera, being drained off by the bowels. It has been proposed to inject into the veins a saline solution, to make up for this deficiency. Cool drinks would certainly answer as good a purpose. The dark, thick, tarry appearance and consistence of the blood, as observed in post mortem examination in this disease, are, doubtless, in part, attributable to the draining off of the watery element of the blood.

The iron of the blood is diminished in anemia, and increased in plethora, and it is, of course, brought to the normal standard by removing those states.

With these remarks upon the alterations in the quality of the blood, consisting in an inequilibrium of its constituents, we bring this branch of the subject to a close.

Second. *Alterations in the quality of the blood by the retention of matters destined for excretion.*

These changes in the blood are generally *secondary*, being produced by some disease of an organ, by which its secreting power is diminished or suspended. Thus

disease of the lungs, as bronchitis or pneumonia, or of the larynx and trachea, as laryngitis and tracheitis, interfere with respiration, and cause the retention of *carbonaceous matters* in the blood, which state of the blood tends rapidly to the production of *somatic* and *molecular* death.

Degrees of this condition of the blood are observed in all diseases of the respiratory passages, serious enough to interfere with respiration.

Active exercise induces it in asthmatics, the action of the muscles transforming the arterial blood to venous faster than diseased lungs can convert it from venous to arterial.

The same thing is seen in the cyanosis of new-born infants, only a part of the blood passing through the lungs, in consequence of the non-closure of the foramen ovale of the septum cordis.

This *carbonaceous state* of the blood is shown by various signs and symptoms; the blue lips, the livid face, and the general uneasiness succeeded by torpor, are sufficiently characteristic.

The treatment will consist in the attempt to remove the diseases of the organs on which it depends. This is, in most cases, *inflammation* and its results.

The blood is *hyper-oxygenated* when the protoxide of nitrogen is respired; but this, perhaps, never occurs in any appreciable degree in disease. The exhilerating effects of this state of the blood, when artificially induced, are what we would, *a priori*, expect; and they form a strong contrast with those induced by the increase of the carbonaceous matters of the blood.

The *bile* is sometimes retained in the blood, or, at least, its pigment; and this state has received the denomination *cholæmia.*

This may be produced, either by the failure of the liver to separate from the blood the elements of bile, or by the absorption of bile after it has been secreted. It is not always easy to say on what particular state of the biliary organs *cholæmia* depends, a point of first importance; for this state of the blood is curable or incurable, according to the nature of the disease of the liver on which it depends.

The signs and symptoms of cholœmia are obvious enough. The eyes and skin have a yellow hue, which enables even the non-professional to recognise it. The urine is loaded with bilious matters, the kidneys acting vicariously for the liver; the bowels are torpid, and the stools of a clay or ashen color—results of the absence of bile in the *prima via.* Occasionally, however, this condition of the bowels and appearance of the stools, are not present, showing that there is not an arrest of flow through the ducts, but imperfect secretion of the liver, or that, at any rate, the common duct is not closed.

Cholœmia produces great debility, and torpor of the nervous system. There is indisposition to bodily or mental effort.

Its effect upon the functions are, indeed, though in a minor degree, similar to those of the carbonaceous state of the blood already described. This is what physiology would lead us to anticipate. The liver, as

well as the lungs, separates carbonaceous matters from the blood, and the bile itself is a compound, containing a considerable amount of carbon.

The treatment of this element of disease must consist mainly in the removal of its cause, *the previous disease of the liver.* When this cannot be removed, of course, the cholœmia is incurable. Much may be done, however, by exercise in fresh air, which enables the lungs to seperate from the blood more than an ordinary amount of carbon; and by confining the patient to a diet deficient in carbonaceous compounds. By these means, life may be often greatly prolonged, even though the liver may be incapable of performing its functions.

As a consequence of functional inactivity of the kidneys, urea frequently accumulates in the blood,—*uræmia.* This is said to occur in the morbus brightii.

Increase of the sugar of the blood, *millitæmia*, occurs in some diseases, as, for example, diabetes. The Lithates of soda and ammonia are sometimes retained in the blood in consequence of inactivity of the kidneys, or they may be generated, in excess, by high living. They probably constitute the *materies morbi* of gout. Be this as it may, they are often deposited about joints, long affected by this painful malady.

When the elements of the urine fail to be secreted by the kidneys, they soon produce on the general system the most marked and deleterious effects. The brain is amongst the first to exhibit their influences; coma comes on, soon to be followed by death, unless the kidneys can be induced to resume their functions.

The treatment of these states of the blood will consist of means calculated to stimulate the kidneys to action, on the one hand, and of dietetic regulations tending to diminish the formation of the particular material or materials causing the cachemia, on the other. Thus an animal diet tends to diminish the saccharine condition of the blood in diabetes.

The matters of perspiration, lactic acid, &c., are very frequently retained in the blood. Lactic acid is regarded by some high authorities as the *materies morbi* of rheumatism. Whether this be so or not, it is reasonable to conclude that the retention of matter ordinarily thrown off by the skin causes a diseased state of the blood, which may, in its turn, cause or modify various lesions of the solids. These matters may fall upon the muscular and fibrous structures, and produce rheumatism. Why they should select, as it were, these tissues, is as easily understood as why the elements of bile are separated from the blood by the liver, rather than by the kidneys. Whatever may be thought of these speculations, it is certain that cold, acting on the skin and suspending its functions, is the most fruitful cause of rheumatism ; and the fact very well established, that the alkalis are amongst our most efficacious means of combatting it, harmonizes well with this theory of its nature.

May not many idiopathic fevers, which we cannot refer to any of the generally recognized species—fevers evidently not dependent on inflammation, which last a day or two, or three, or even a week, be reasonably

attributed to an altered condition of the bloo , occasioned by the imperfect action of some of the secreting organs ; and may not their cure be due to the elimination of the offending material ? Such would be true idiopathic fevers, and such, we doubt not, is the nature of the ephemeral and lighter forms of this class of diseases.

CHAPTER VIII.

THE ESSENTIAL FEVERS.

We proceed to the consideration, thirdly, of *changes induced in the quality of the blood by the admixture of foreign matters.*

That there exist such morbid changes as these, is generally admitted; and that the *essential fevers* consist in these changes, is rendered more than probable by the following facts.

First. Diseases, analogous in their phenomena to these fevers, have been induced by injecting putrid matters into the veins of animals. The experiments of Magendie have fully proved this, to say nothing of the experiments of others tending to the same conclusion.

Second. Some of these fevers (the idiopathic or essential) are caused by animal poisons, which are known to produce their specific effects when introduced into the circulation, as, for example, small pox by inoculation. Dr. Francis Home caused measles by inoculating with the blood of a person affected with this disease. In these cases, there can be no doubt that the blood is

changed by the poison, that the poison operates through the blood.

Third. It is well known that these poisons are capable of acting on the system through the medium of the air; and it is easy to perceive how, acting through such a medium, they can have access to the blood through the lungs. It is strange that any pathologist, worthy of the name, should have ever looked over this obvious mode of the action of these causes, and referred their primary action to the brain or stomach. *They must, of necessity, alter the composition of the blood by entering into it through the lungs.*

Fourth. The non-contagious fevers are also almost universally admitted to depend upon a poisoned or changed condition of the atmosphere, such as the intermittent, the remittent, and some forms of contagious fever; and it is obvious that these poisons are as readily brought into contact with the blood as those of the contagious fevers.

Fifth. The blood is actually observed to be altered in its appearance in the diseases which have been denominated *essential fevers.* If these statements be true, there are such changes as alterations in the quality of the blood by the admixture of foreign matters, and these changes constitute the essence of the idiopathic fevers.

In reasoning on the subject of fevers, it is necessary to bear in mind the two very different senses in which the term *fever* is employed. In one sense, it is used to signify a symptom or collection of symptoms, as a quick frequent pulse and increased heat. In this sense, we

say a person has fever, or some fever, considerable fever, or but little fever. In the other sense, it is used to signify, not a symptom, or collection of symptoms, but a *condition* of the system, which condition generally causes increase of heat, quick pulse, &c.; but this *condition* of the system does not necessarily give rise to such symptoms, for in the worst forms of fever, there is often no fever! In this sense of the term, we may say a person has a fever, or a certain species of fever. In other words, fever is the name of a *disease*, and also the name of a *symptom*.

Fever, in its symptomatic sense, always attends acute inflammation; but it is evident that it also results from other pathological states. What we have already said is sufficient to show that the admitted causes of certain diseases, in which are observed the phenomena of fever, act through the blood, act by poisoning or deteriorating the blood; but this might be admitted, and it might still be contended that *fever*, viz: the changes in the pulse, temperature, &c., depend even in those cases on inflammation. It might be contended that these phenomena are the result of the inflammation of some of the tissues, caused by the poison contained in the blood.

Such is the view of several pathologists. They suppose that the cause of fever acts, first by poisoning the blood, but that this poison or *materies morbi* soon causes some degree of inflammation in some of the organs or tissues, and that the increase in the temperature of the body, and the febrile phenomena in general are the direct result of this secondary inflammation. This may be, sometimes, the proper explanation; but may the

phenomena termed febrile exist independently of inflammation? We answer in the affirmative, for the following, to us, satisfactory reasons.

First. In many cases, in which the symptoms termed febrile exist, there is no evidence of inflammation revealed by *post mortem* inspection.

Second. These symptoms co-exist with a diminution of the fibrin of the blood; whereas, in inflammation of sufficient intensity to produce them, there is always observed an increase of the fibrin of the blood. This fact has been incontrovertibly established by Andral.

Third. These symptoms (the febrile) often co-exist with a diminished tolerance of losses of blood on the part of the system; whereas, in inflammation this tolerance is increased, the system being capable of bearing far greater losses of blood, before the approach of syncope, than in health.

From the foregoing facts, we think it reasonable to conclude:

First. That the class of diseases, known as fevers, consist in *alterations of the quality of the blood, by the admixture of foreign materials;* and

Second. That these states of the blood cause the phenomena of fever, without the intervention of inflammation; in other words, that there are such diseases as *idiopathic* or *essential fevers.*

It would be inconsistent with the design of these outlines to attempt to exhaust the interesting subject of essential fevers. Our limits, moreover, forbid such an effort. Our object is merely to present, in a brief man-

ner, a few of the leading facts and arguments which go to establish the existence of such diseases, and which point to certain qualitative changes of the blood as constituting their essence. — This doctrine is very much like the ancient and, at one time, thought to be exploded dogma of *humoralism*; but we are not disposed to reject what appears to us to be sustained by facts and logic, because it may have been the faith of past ages, or because its opposers have found for it a nick-name.

According to the principles here advanced, essential fever is truly a general disease; for the blood, being affected, must, of necessity, derange all the functions in some degree. Such was the definition or rather description of fever given by Fordyce, and which has been so often quoted and eulogised, viz: that fever is a disease of the fluids and the solids, including all the organs — a disease of the body and of the mind. We do not pretend to give the exact language of the author; but this is the substance; and the universality of the malady is well explained by the fact, that the blood is diseased.

There are many clearly distinguished *species* of fever— in other words, there are many specific contaminations of the blood. The poison, which causes small-pox, is quite distinct from that which produces measles, and this is different from that which gives rise to typhus fever.

The *symptoms* of fever are as various as the kinds and the degree of the causes producing them, and these are almost infinite. The most invariable symptoms are ma-

laise, followed by chills or chilly feelings, which gradually give way to increased heat and an accelerated pulse, which subside after a longer or shorter time with sweating or a moist skin. Sometimes, the cold, the hot, and the sweating stages follow each other in rapid succession, and the patient is, for a day or more, apparently free from disease. Sometimes there is a mere remission of the fever, and sometimes it is continued with but little variation for weeks. — Upon these differences in the symptoms of these diseases has been founded the most generally received classification of fevers, viz: *the paroxysmal and the continued*, the former including intermittents, remittents, and even yellow fever, as varieties, and the latter — typhus, in all its forms, small-pox, measles, scarlatina, etc., which are different species. Continued fevers have been subdivided into the eruptive and the non-eruptive: the former subdivision including the exanthemata, and the latter, typhus, typhoid, &c.; but the latter are eruptive as well as the former, though not to the same extent.

If fever be some poisoned condition of the blood, it is evident that it can be cured only by correcting or neutralizing this poison, or by procuring its elimination from the system, through the emunctories. The latter is the mode adopted by Nature. In factitious fevers, induced by the injecting of foreign matters into the veins, it is by secretion that the system gets rid of them — the injected substance being detected in the secretions. Some matters or poisons seem to be eliminated with greater difficulty than others, and to require a longer time for

the process. May not this be the reason of the difference as well of the duration, as of many other of the phenomena of fever?

How is it that the chill, the reaction, the diaphoresis, the increase and the decrease of the other secretions are produced?

It is difficult to find a satisfactory explanation of these phenomena. It may be safely asserted, however, that they depend on changes of nutrition, or metamorphosis of the tissues; and the main question or difficulty is to account for these changes of nutrition.

In the incipiency of inflammation, as well as of essential fevers, there are chills or chilly feelings. The engorgement of incipient inflammation necessarily causes a partial anemia of the periphery with consequent diminished action. Hence the chill in inflammation. We have attributed the fever, which follows, to the impetus given by the inflamed part to the torrent of the circulation — to the highly *increased and deranged nutrition*, in which inflammation essentially consists.

It is, perhaps, not more difficult to understand how the chill of an essential fever is produced. The blood is changed, it is poisoned to a degree; and the consequence is, that it does not keep up that degree of nutrition or metamorphosis necessary to normal warmth. The heart itself partakes of the debility consequent on a lowered vitality of the blood, and sends the vital current to the arterial capillaries in smaller and feebler currents. Hence the chill of an essential fever, dependent evidently on diminished nutrition or metamorphosis, which is the effect

of a diminution in the amount and an alteration in the quality of the blood sent to the arterial capillaries.

But how is the reaction explained? It is comparatively easy to *descend* to the chill,—"facile descensus Averni;" but to *rise* to the fever point is not so easy,—"hic labor, hoc opus est." Nature brings about the reaction, by *respiration* and *rest*,—but this is not an explanation, it is a cutting, not an untying, of the Gordian knot.

The increased respiration, which takes place during the chill, introduces an increased amount of oxygen into the blood; the inaction of the muscles renders less oxygen necessary, so that an accumulation of the gas takes place: the blood becomes highly arterialized;—hence the reaction. Cold water to *wash* the blood and secretion to separate this water and the materies morbi from the blood effect the cure.

The plegmasiæ, which supervene on the essential fevers, are accounted for by the fact that blood, when much changed from its normal state, does not circulate with facility through the capillary vessels; hence congestions and various degrees of inflammation. These phlegmasiæ, though not an essential part of fever, are very frequent concomitants of it, and to obviate them, and to subdue them by appropriate treatment, when they arise, is the main business of the physician. The fever itself he cannot cure. He has no antidote to neutralize the poison. He does not know even the nature of the poison. He can merely aid the efforts of the system, so far as the fever is concerned, but he can do more than this in the treatment of inflammation.

The causes of fever are, as we have already said, numerous and various. The paroxysmal are generally admitted to result from malaria or marsh miasmata — a peculiar poison, generated in marshy districts under the influence of heat. As we have already said, this poison has never been detected by the finest and most searching tests; and some physicians deny the existence of such a poison. They explain all the facts by heat and moisture alone. It has been observed, that these fevers (the paroxysmal,) prevail mostly in low marshy situations. From this fact, the advocates for a positive poison contend that something is evolved from these marshes; but the non-malariaists with, perhaps, equal reason attribute the disease to the great dampness of such locations. It has been observed that ground floors are more unhealthy than upper stories, and the malariaists have concluded from this fact, that the poison is heavy, and therefore must concentrate near the earth. Their opposers, however, say that ground floors are more damp, and subject to greater and more rapid changes of temperature than upper stories.

It has been observed that the hours of sunrise and sunset, or thereabout, were the worst periods of the day for exposure to this supposed poison,—a fact which the malariaists explain by the hypothesis, that at the former hour it is rising, and at the latter, falling again to the earth; but the anti-malariaist explains the fact by the rising and falling dews. It has been observed that a forest or any other obstruction to the passage of the air was sufficient to arrest the march of the supposed poison;

but to this it has been answered, that such obstruction prevented equally well the moist air from passing, which, it was contended, was adequate to the production of the disease in question. To terminate this comparison — these paroxysmal fevers are explained about as well without as with the hypothesis of a positive poison.

If these fevers be produced by certain hygrometric and thermometric states of the atmosphere, then it is probable that the blood is changed in its composition *secondarily* and not *primarily* — that the cool damp air suspends the functions of the skin, and thus poisons the blood by the retention of matters destined for *execretion*, and it may be that the reason, why the paroxysm of an intermittent is so soon over, is, that the *materies morbi*, being the matter naturally eliminated by this emunctory, is more easily got rid of than a foreign poison, such as the virus of small-pox or measles. A Parisian physician, M. Brachet, made the following experiment. He immersed himself in the river Seine every night for several nights in succession. The result was, that the chilly feelings returned at the same hour, for several days in succession, followed by reaction. In a word, by this means he induced a disease in all respects similar to intermittent fever. Here there was coldness and moisture, followed by heat; for he enveloped himself in blankets, on coming out of the water; and the chill and the fever continued to recur long after he ceased the experiments. According to the view of the paroxysms of paroxysmal fever here presented, the fluids are secondarily affected; but still these are essential fevers, inas-

much as they are not the result of an inflammation, but of a suspension of function of an excreting organ from other pathological states. We shall not pursue this subject; but it may be added, that this view of the pathology of paroxysmal fever harmonizes well with the fact, that it can be often checked and even cured by stimulants and those agents in general, which are known to determine the circulation to the skin, and that Nature cures them by a copious diaphoresis. Such is not the fact in regard to those fevers, which evidently depend on a foreign poison.

Of the causes of small pox, measles, scarlatina and some of the rest of the exanthemata, it is sufficient to say that they are produced or rather re-produced by the human system itself. How these were first produced, it is impossible to explain; we may, however, reasonably suppose that a rare concurrence of circumstances first engendered them. May not such a *concurrence* recur — may not these diseases be sometimes generated *de novo?* This would seem to be true in regard to typhus fever. Indeed, many pathologists contend that filth, imperfect ventilation, insufficient nourishment and the depressed state of mind consequent on such circumstances are adequate of themselves to the production of typhus. This view is not at variance with the idea, that it may be afterwards propagated by contagion. All admit, that the above mentioned circumstances favor the spread of the disease. That it is contagious, seems to be established beyond the possibility of a doubt; but that it, at some remote epoch, was produced by some circumstance or

circumstances, must also be admitted ; and in given cases of the disease, it is often impossible to determine in which of these ways it has been produced. How difficult it is to avoid confusion in treating of subjects so recondite as these! How difficult to estimate the various elements of disease as they combine in that obscure and almost impenetrable laboratory, the human system! We have endeavored to say something of congestion, active and passive ; of inflammation, anemia, and various qualitative changes of the blood, the result of previous disease. We have treated briefly of the *essential fevers*, and rendered more than probable, we think, the theory, that they consist in certain qualitative changes of the blood, caused by the introduction of foreign matters. But almost all these elements are sometimes crowded together, as it were, in an individual case. The old doctrine, that but one disease can occupy the system at a time, is evidently in the main false. A person, it is true, cannot have general anemia and general plethora at the same time; but he may have small pox and erysipelas together. An essential fever, perhaps two or three of them, and an inflammation may co-exist.

According to the views here advanced, many diseases should be regarded as fevers which have not been thus considered. Rheumatism and gout, doubtless, depend on a materies morbi in the blood and are, therefore, *essential fevers*. Cholera is evidently an essential fever. All diseases which consist in qualitative changes in the blood, whether from matters destined for excretion, or from foreign poisons, are very much alike in their nature ; and

the *vis medicatrix* rids the system of all these poisons in very much the same way, *by secretion*. The treatment in all is very much the same. With this view of the subject, idiopathic or essential fevers might be divided into two classes, the first embracing the species dependent on the retention of matters which are destined for excretion; and the second, including the species dependent on foreign poisons. But the question arises, would it be proper to call the first class *essential fevers*, as they are *secondary*, and dependent on the suspension of the function of some organ or organs — dependent, in other words, on a local disease? We answer in the affirmative, if by sympathetic or symptomatic fever be meant only that, which depends on inflammation or irritation; and in the negative, if, by sympathetic or symptomatic fever, be meant that, which depends on any local disease whatever. Of course, we here use the term fever in its *substantive* sense. We have already noticed the dispute as to which of these two classes of disease intermittent fever belongs.

The distinction between the various forms of congestion, (including the phlegmasiæ), and fever, is plain enough; yet the one rarely occurs without the other. The one produces the other, or, at any rate, has a strong tendency to do so. Thus congestion or inflammation is sure to interfere with the secretions, and cause their retention to some degree, and the fevers are equally prone to produce congestion and inflammation. To express the whole in a few words, *quantitative* changes in the circulation, induce those of *quality*, and *qualitative* changes

induce those of *quantity;* and both, to some extent, occur in every case of disease — sometimes the one, and sometimes the other, being *primary* — sometimes the one, and sometimes the other, predominating. One more consideration: Is the state of the blood, which we have shown to constitute the essence of the idiopathic fevers, capable of producing the increased heat and frequent pulse which constitute *fever* in the symptomatic sense of the term, without the intervention of some degree of inflammation? Andral has proven this to be so, but has not stated whether or not there were, in the cases experimented with, these *symptoms well developed, viz: heat and a frequent pulse.* We incline to the opinion, that when these symptoms are continued for several days together, without intermission or remission, they are dependent on inflammation, though this latter may itself be dependent on the *materies morbi* of an essential fever — that is, when the state of the pulse and increase of heat are well marked, obstinate, and for a long time persistent, we are disposed to refer them rather to a secondary inflammation than to the poisoned blood itself. This opinion is founded entirely upon what we have observed in disease, and not upon any preconceived notion.

Evidently in the worst forms of essential fever, those in which the fibrin of the blood is at its pathological minimum, there is not much reaction — that is, not much heat and increase of pulse; and sometimes death takes place in the cold stage of the disease, and in such case we may say that the patient has died of a fever, without any fever!

If our remarks appear to the reader rather crude, and in some degree confused, we beg him to consider, 1st., that the fault may be partly in himself; and 2d, that in the present state of science, and of medical terminology, the essential fevers are a crude and confused subject — a labyrinth through whose intricate windings the Ariadne of genius has not yet been able to run an unerring thread.

CHAPTER IX.

TREATMENT OF FEVER.

In the paroxysmal forms of fever, we observe the system passing through the cold, the hot and the sweating stages, and returning to something like ordinary health. It is evident that under such circumstances the system has rid itself of something, or some condition which interfered with its healthy functions; and it is equally evident, that the system is capable of performing this office itself, independently of the physician's aid. Let no one suppose, from this remark that we underrate the services of the intelligent physician. There may be, and there often is, need of his aid. He is the minister of Nature. There may be a degree of depression and exhaustion, which he may relieve by stimuli and sustaining means in general. There may be such reaction, as to threaten the integrity of some important organ: that is, there may be insufficient or excessive reaction; and in either case, it is in his power to render important assistance. There is a median grade of reaction, in which Nature needs not his services.

What we have said of a paroxysm of intermittent fever applies to the entire course of a continued fever. In continued fever, owing to the difference in the character of the poison or cause producing it, *the system cannot right itself — cannot get rid of the materies morbi* — so readily. Indeed, as already remarked, there may be in the paroxysmal forms of fever no materies morbi, except the temporarily retained secretions; and the fact, that certain tonics or stimulants as quinine, etc., prevent the recurrence of the disease, would seem to show that it consists in temporary venous congestion and temporary retention of some of the secretions.

We pass by the further consideration of paroxysmal fevers.

The old division of *continued fevers*, into *synocha*, *synochus* and *typhus*, is founded in truth. It was not pretended there are three distinct species of fever — the *synocha*, the *synochus* and the *typhus* — all that was meant was, that continued fever is sometimes of a high inflammatory or synochal grade, sometimes of a moderate, median or synochus grade, and sometimes of a low debilitated or typhus grade. Thus it was said that a fever might commence as synocha, and then pass into synochus, and end in typhus. This classification was one rather of grades than of species. It is founded in truth, and is important in a practical point of view.

Evidently, owing to the strength of the morbific cause and the state of the system, the powers of nature are adequate in many instances to the restoration of the system to health, without much, or even any assistance. It is

equally clear, that in some cases the reaction is of the high or synochal grade, threatening inflammation of some important organ or part, and that in other cases there is inability on the part of the system to react with sufficient energy to rid itself of the depressing influences, to which it is subjected.

The treatment employed should evidently be regulated by the grade of the disease. In therapeutics, the *degree* of the disease is as important as the *kind* of the disease.

What, then, is the treatment proper in fever — continued fever? This depends, in the commencement, mainly on its grade.

Is there active reaction with determination to the head or chest, threatening inflammation of the brain or lungs? Bleeding, general and local, should be resorted to; not that bleeding will remove the condition of the blood in which the disease mainly consists, but to prevent a dangerous complication, and thus favor the efforts of nature in rectifying the condition of the system.

Is there moderate reaction, without any indication of local disease? Nothing is necessary to be done except to favor the action of the various emunctories, by which the poison of the blood may be eliminated — by which the toxæmia may be corrected. We have said that venesection should precede these remedies in the synochal or inflammatory cases. No one can doubt, that the secretions may eliminate foreign matters from the blood. Continued fever mainly consists, as has been shown, in such contaminations of the vital fluid: bleeding cannot directly remove them, nor cold applications, nor stimuli, nor any

other means known to the profession; but these means may be of great service in enabling the system *to rid itself* of them.

Is the grade of the fever of the low or typhoid character? Here the roborant or stimulating course is demanded — wine, carbonate of ammonia, nutritious broths, etc. In a word, the indications in the treatment of fever, in the beginning, are to obviate the tendency to inflammation and to depression, and to promote the elimination of the materies morbi. The latter indication exists in all cases; the two former cannot of course co-exist.

These views reconcile, we conceive, the contradictory accounts of the successful treatment of continued fever.

Some physicians have been most successful with the antiphlogistic course, including blood-letting — as Bouillaud, of Paris. Were not his cases generally of the inflammatory type? We think so. Some have found the spts. mindereri the most successful medicine — as Crampton, of Dublin. Were not his cases of a mild type — the synochus? Doubtless they were.

Others have succeeded best with wine, and the roborant plan in general — as Stokes. Were not his cases of the marked typhus grade? They were, as he himself informed us.

Furthermore, each individual case will require a modification of the treatment thus generally indicated, according as it tends to the one or the other of the forms or grades just mentioned. The case, which, in the commencement, called for blood letting, may towards its termination require stimuli,—and the converse.

In fever, there is a strong tendency to the enkindling of inflammatory affections. These are rarely absent, when the fever is of considerable duration, and to them the attention of the physician should at all times be directed. Though he cannot cure a fever, that is, cut it short by a specific or antidote, he can ward off or remove these inflammatory complications, which are in a vast number of cases the immediate cause of death, and thus conduct the disease to a favorable termination. The organs, most frequently the seats of these complications, are the brain, the lungs, and the mucous membrane of the prima via. These inflammations come on in many instances early in the disease, so early sometimes as to have induced the belief, that they are the causes of the febrile phenomena. A certain inflammation of the glands of the small intestines (Dothinenterie of Bretton-eau,) is regarded by many pathologists as constituting a necessary element of one form of continued fever. The researches of Louis and others show that this lesion is very frequent in the fevers of France and the continent of Europe. They show, indeed, that it occurs in a vast majority of cases, which terminate fatally. This is not, however, found to be true, in the continued fevers of England and Ireland.

Do those cases, in which the intestinal lesion occurs, differ specifically from those in which it does not occur? We think not. If the intestinal inflammation is sufficient to constitute a specific difference, why not also the cerebral, the pulmonary, the hepatic, the renal, the gastric? Any or all these organs may suffer irritations, in the

course of fever, but these irritations are not an essential part of the disease. They are but results of a previous toxihemia.

It has been contended, that the enteric form of fever is a different species from that in which there is no intestinal lesion, and Professor Bartlett has brought forward a vast array of facts, which he thinks justifies such a view. To the fever with the intestinal lesion he applies, after other high authorities, the epithet *Typhoid*, and to that in which this lesion does not occur that of *Typhus*.

We have examined his facts with considerable care, and all the difference that we can see between the enteric and non-enteric form of fever — the typhoid and the typhus, is easily accounted for, by the presence of this local lesion in the former and its absence in the latter; and, as we have hinted, if such differences are regarded as specific, we must regard every inflammatory complication of fever as constituting a species of the cases, in which it may occur. It is argued by Professor Bartlett and others, that, in the *typhoid* or intestinal fevers, the cutaneous eruption is different from that which occurs in typhus or the non-enteric form, the rose spots occurring in the former, and the petechia in the latter; but he himself quotes the cases of Landouzi, of Rheims, in which both forms of the eruption were observed; and there is ample evidence, that in a great number of cases neither occurs. We admit, however, with Professor B., that it is equally important in a therapeutic point of view to distinguish, to diagnosticate these different sorts of cases, whether they be separate *species*, or only sepa-

rate *forms* or *varieties* of fever; but it is equally important also, to diagnose all the inflammatory complications, which may supervene. Nothing is more important than the detecting and combating of these secondary inflammations, which are prone to arise in the course of continued fever. When present, they are to be treated on general principles — principles already discussed. The treatment for inflammation is to be employed. Is the brain the seat of the secondary disease? local bleeding, cold applications, purging, revulsives, and even mercurials will be demanded. The lungs, when inflamed, require very much the same course; when the intestinal lesion exists, instead of purging the patient, demulcent drinks, and even opiates and astringents are called for; in a word, these inflammations supervening in fever are to be treated just as they would be if supervening on any other state of the system, with this difference only, that owing to the tendency to prostration in fever antiphlogistics are to be employed with more caution and less freely in the phlogoses, which attend it, than in those which supervene on a healthy state of the blood.

It was a maxim of Cullen, that, in the treatment of fever, the indications were to obviate the tendency to death; a maxim fraught with practical importance; for the *atria mortis* in fever include all the modes, in which death can invade the system. There may be death by coma — brought on by cerebral congestion or inflammation, death by apnea, induced by pneumonia, death by ænemia, induced by exhausting discharges, etc., death by necremia, induced by the primary poison and sub-

sequent retention of matters destined for secretion, etc., that is death in any one or two of all the modes. It is the business of the physician to foresee the mode, in which it is about to approach, and obviate that mode; to relieve the cerebral congestion which may threaten coma, to cure the pneumonitis which may menace apnea, to endeavor by broths and wine and the checking of exhausting discharges to repair the loss of blood, which may lead to fatal anemia, and by similar means to prevent necremia. Thus the action of the system may be kept up until the fever may pass off — until the organs may rid themselves of the poison of their nutritive fluid, in whose deteriorated condition the disease essentially consists.

We cannot cure a fever. We know of no substance, which, introduced into the circulation, will correct the diseased state of the blood; and even if we knew the nature of the poisons and possessed substances which could neutralize them in the blood, the third substance thus formed in the blood would constitute a materies morbi itself, which would require elimination by the secretions before a cure could be effected.

If these views of the pathology of continued fever be correct, the ancient doctrine of *critical discharges* must be founded in truth. With some restrictions, the same may be said of *critical days*. We have not been able to verify the details of the ancient enumerations of these days; but it seems evident, that continued fever is disposed to terminate at the end of the first, second, and third septenary periods. Many circumstances — the previous health of of the patient, the degree of the poison, the character of

the treatment, etc., may facilitate or retard the period of these crises.

A few words regarding diet and drinks. Nature, "the divinity that stirs within us," imperiously demands cold drinks. The patient should have them almost, if not altogether, *ad libitum*. It has been objected, that the stomach often rejects them. True, when they have become warm, when they have acquired something like the stomach's temperature, *nature often rejects them and demands more cold drink*; but the irritation and vomiting are relieved in this very way, just as the active congestion in cerebritis is relieved by frequent applications of cold to the head. When the cold cloths applied to the head become warm, we remove them, and re-apply the cold. Nature indicates the same course in the gastric irritation so common in continued fever. It is not, however, in this way alone, that cold drinks do good; they dilute the blood and favor the elimination of the materies morbi.

Similar remarks may be made regarding diet; most generally there is very little appetite. Under such circumstances, but very little food should be taken. When the appetite returns, it should be gratified; care should be taken, however, that the food be of a character to leave no residue in the bowels, capable of becoming a cause of irritation; this remark applies especially to the diet of patients laboring under the enteric (typhoid) form of continued fever, for in this form errors in diet are among the most frequent causes of relapse and retardation of convalescence.

To sum up in a few words all that we have said of

the treatment of Fever: we must commence with the lancet and the antiphlogistic course in general, and such means as promote the action of the various emunctories, if the case be inflammatory (*synochal*) in its tendency; with a stimulant and sustaining course, if the case tend to prostration, (*typhus*), the secretions being at the same time promoted; and in the medium grade, where the reaction does not run so high as to threaten inflammation, nor is so deficient as to menace prostration, the mild remedies alone, which moderately stimulate the emunctories, are all that is required; indeed, no medicine is absolutely necessary in these latter.

Whatever be the treatment commenced with, it will be varied in the course of the disease, according as it tends to one or the other of the grades mentioned. Inflammatory complications supervening will be treated on those general principles which govern the treatment of the phlogoses, but in a more cautious and less energetic degree, on account of an inherent tendency to prostration. The tendency to death must be obviated in the latter stage of the disease by correcting, as far as possible, those states of the organs and of the blood, through which this most dreaded of all physical evils enters this mysterious, active, busy microcosm, to still and silence its movements forever. We recommend not the heroic practice of the fever-curer nor that sceptical non-interference, which has been styled "a meditation on death;" but a course founded on what seems clearly to us a rational pathology, and on the eternal truth, that Nature, in fever at least, is the wisest and most efficient physician.

CHAPTER X.

HÆMORRHAGE—DROPSY—FLUX.

We have already alluded to these effusions in connection with the morbid states, which produce them. They are not diseases, but mere results of disease; at any rate, they are not *primary* diseases. It is true, that the effusion of blood or of serum into the interstices of organs alters the structure of such organs to a degree, which greatly interferes with their functions — that is, that effusions cause or constitute secondary diseases. The act of effusion is but a symptom of some previous morbid state; but the result of this act may be a secondary altered state of an organ — in other words, a species of *secondary* disease. These remarks apply to effusions from the vascular system, only when they take place in the tissues of organs or in closed sacs. When they take place upon the mucous or cutaneous surfaces, they pass off without causing such secondary structural lesion.

The mere act of effusion, whether of the blood or of its watery portion, should be classed, with the "*lesions of secretion*," amongst the symptoms of disease. In-

creased secretion as well deserves to be called a disease as the effusion of blood—both are but symptoms; but the effusion of blood very often clogs the organ in which it takes place, and thus produces a species of secondary disease; whereas, the increased secretion of an organ — say of the kidney — passes off without producing such secondary derangement. When (as is sometimes the case) these secretions cannot make their exit from the system, they also produce secondary morbid states of the organs. We wish always to present clearly the view, that *diseases* are *states* of the system, and never to confound these states with the deranged *actions* or *functions*, which are their consequences. These *actions* or functions, thus deranged, lead of course to secondary altered *states* of the system, in many instances. We have seen how effusions from the vascular system do this, and why, in general, mere increased secretions do not; we say in general, for a secreted fluid sometimes, by its irritating properties, causes secondary inflammation; and changes in the action of secretion cause, often, secondary changes in the blood itself; all that is meant is, that the secreted fluid itself rarely causes disease, being upon a free surface, and not in the interstices of the organs or a closed cavity.

A flux differs from a dropsy only in the circumstance, that in the one case a mucous, and in the other a serous surface, or the cellular tissue, is the seat of the effusion. A dropsy is a flux, which has not a natural opening for egress. A flux is a dropsy, which has a natural opening for egress. A hæmorrhage may take place in either of the locations. Briefly to state the facts: Congestion, whe-

ther active or passive, often causes effusion of the serous portion of the blood on mucous surfaces (flux), or in the substance of organs or closed sacs (dropsy), or effusion of the blood itself in both locations (hæmorrhagy:) and it may be added, in a word, that the cure of these results is mainly effected by the removal of the congestion — we say *mainly*, because there are other morbid elements, which contribute to their production. These are certain changes in the quality of the blood. Thus hæmorrhagy is favored by an increased proportion of the *red globules* and a diminution of the *fibrin* of the blood; and this explains why it takes place so readily in *general plethora*, and in some of the essential fevers. Dropsy is favored by an impoverished hydræmic state of the blood; and this explains why it so frequently follows in the train of hæmorrhage, of albuminuria, and of debilitants of every kind, when long in action. The same remarks apply equally to the fluxes; so that in the diagnosis of the state, causing these three classes of effusions, the *qualitative* and as well as the *quantitative* changes in the blood must be considered.

The prognosis of hæmorrhages, dropsies, fluxes, is favorable or unfavorable, according as the states on which they depend are curable, or the reverse.

The treatment of these morbid actions and their results, like their prognosis, is determined of course by the disease producing them. When dependent on active congestion or inflammation, the means already indicated as proper in combatting these elements of disease will be resorted to. Indeed a flux or hæmorrhagy tends power-

fully of itself to cure the congestion on which it depends; but as the organ, which may be its seat, is often injured by the process, it is advisable to relieve such congestion by other modes. When the means for the reduction of the congestion have been pushed sufficiently far, certain agents which act on the tone of the vessels should be resorted to; these are the astringent tonics, the acetate of lead, kino, etc., etc. We remark, *en passant*, that a combination of the former and opium, with or without calomel, according to circumstances, constituted our most reliable internal remedy in cholera. We used it in every case, *per os et per anum*, and we found nothing else so potent in arresting the flux of that fearful disease.

It may be asserted, in general, that these profluvia, when dependent on active congestion are curable; but this is no more than to assert, that active congestion and inflammation are generally curable. They are oftenest incurable, when the result of *passive* congestion — that is to say, passive congestion is very frequently caused by irremoveable obstructions in the course of the circulation, as in that altered state of the liver termed cirrhosis, and diseases of the orifices of the heart.

Cirrhosis interferes with the passage of the portal blood through the liver, and thus leads to diarrhœa, hæmorrhagy of the bowels, and sooner or later, to ascites. Diseases of the heart's orifices interfere with the passage of blood through that organ, cause general venous congestion, and consequently general dropsy. Diseases of the kidney act rather differently; the function of renal secretion being impaired, the blood becomes, as a consequence,

more *watery* than it should be. This watery blood does not pass through the capillaries with the facility that characterizes the movements of healthy blood; or it does not stimulate the heart to that normal action necessary to its unimpeded passage from the venous to the arterial system; hence a degree of venous congestion, and only a slight degree, is necessary to cause aqueous effusion when the aqueous element of the blood is in considerable excess. Thus it is, that disease of the kidneys, as well as disease of the heart, produces general dropsy — renal and cardiac dropsies, as they are termed. To cure these dropsies, the causes of the congestion and hydræmia producing them must be removed. These causes (renal and cardiac lesions) are most generally incurable, and, therefore, these dropsies are among the opprobria of the art.

Very often, even when the state of the circulation causing a dropsy is reduced, the effusion remains, and calls for remedies to favor its removal. The peritonitis that causes the ascites may be cured and the ascites yet remain. Here, hydragogues and diuretics are indicated. These remedies induce actions by which the blood is drained of its water, and thus favor the absorption of any deposits of that fluid; of these two classes of agents, hydragogues are much the most potent and reliable — we have found nothing more useful than a combination of bitart pot. and jalap. This produces copious watery evacuations, and often leads to the rapid removal of dropsies. These means should be employed for the removal of such accumulations, whether the states of the system causing them can be permanently removed or

not; for in those cases, in which they cannot cure, they at least palliate — they at least afford temporary relief. How often have we had cause for rejoicing in beholding the placid features and quiet breathing of our patients, (after the full effects of these remedies) who, but a few hours before, were tortured with the most agonizing dyspnea!

The physician should not fail to use these remedies, these artificial pumps of the life-boat, merely because he cannot stop the leak, which will ultimately sink it.

Hæmorrhage, dropsy and flux are three kindred results of congestion, the one or the other taking place according to slight differences in the circumstances of the case, as already remarked. The happening of the one, therefore, prevents, for the time, the other two. Thus they are the substitutes or remedies for each other, to a great degree.

It is easy to see how a bleeding, that is a hæmorrhagy, will prevent or cure a dropsy or flux. We have already remarked the manner in which a flux, induced by hydragogue cathartics cures a dropsy. The same, for reasons too plain to be detailed, acts equally well in relieving hæmorrhage. A flux might be cured by inducing a dropsy; but this is never done as the cure would be worse than the disease. The doctrine of the *unity of disease*, as inculcated by Rush, was evidently pushed too far by that distinguished teacher; but no one can reflect on the intimate connection of the elements of disease—how they shade off into each other by insensible degrees, and how various are the results and the phenomena which the same element presents according to its degree and its

seat — without coming to the conclusion, that the doctrine had its foundation in truth, and that it was the offspring of a philosophic mind.

The question may here suggest itself — as the morbid actions treated of in this chapter no more deserve the title of disease than the other morbid actions, as deranged secretion and deranged innervation,—why treat of the former as such and not of the latter also? We have this answer: The profluvia being often arrested in the tissues alter them, and thus constitute a species of secondary disease, which demands some peculiarity of treatment; whereas in altered secretion, etc., this is not the case. When altered secretions produce disease, it is some of the elements of disease already alluded to. We admit, or rather contend, that these effusions are but symptoms, and should be classed with those other diseased *actions*, the *changes* of secretion and the changes of innervation. Still further, we admit, or rather contend, that all the *changes* in the *act* of nutrition are but symptoms, as well as the changes of secretion are; but these changes of nutrition produce directly alterations in the composition and structure of the solids — alterations of the organization — of the *state* of the parts, which notably derange the functions of those parts, which answer, consequently, to our definition of disease — "change of organization," — and which are very clearly seen to constitute the third category of elements embraced in the formula, "alterations of the quantity and quality of the blood and alterations of the solids, consequent thereon." Of these alterations of the solids we now proceed to speak. They depend

upon previous changes of the fluid, but are so intimately connected with these previous changes that they seem to take place almost simultaneously with them. They are, nevertheless, evidently but effects.

In what modes can the nutritive *act* be changed? In three: It may be *increased*, it may be *decreased*, it may be *pervertod*. Two of these modes may be combined.

So, also, of secretion. It may be increased, decreased or perverted. There are no other possible or conceivable modes of changing any action of any organ or of any thing.

The resulting changes of the solids are an increase in the size of the organs, termed hypertrophy; a diminution of size, termed atrophy; and certain deviations in the nature of the tissues — in the organization and composition of the parts, termed cacotrophy or perverted nutrition. In brief, these changes in the organization known by the names of hypertrophy, atrophy, and perverted nutrition, two of which may be combined. There are no other possible or conceivable changes of the solid structures. All the changes described in the works of pathological anatomists range themselves under these heads. All pathological anatomists virtually recognize this classification. Indeed, it is the classification, *verbatim*, of Dr. Williams; it is the classification of nature. Of these lesions of the solids, we shall proceed to treat in our next chapter. We close the present chapter with a query, which we would not hesitate to answer in the negative: — Has any writer on pathological anatomy ever described a disease of the solids not clearly dependent on previous lesion of the fluids?

CHAPTER XI.

PATHOLOGICAL CHANGES OF THE SOLIDS.

These depend on previous alterations (quantitative and qualitative) of the fluids. This conclusion seems necessarily to flow from the physiological fact, that the solids are formed and nourished from the fluids. As long as the fluids — normal in quantity and quality — are furnished to the solids, we can find no reason why the latter should undergo any change of structure, or become clogged with any abnormal deposit. As already remarked, there are but three conceivable modes in which the solids can be changed, (solutions of continuity from violent chemical and mechanical action excepted) viz: their nutrition may be simply increased, and they may become hypertrophied; nutrition may be simply diminished, so as to produce atrophy; nutrition may be perverted, so that the resulting structures may be different *in kind* from the normal tissues; in other words, the changes of the solids — the lesions of nutrition, as they have been termed — are necessarily included under three heads of *increased*, *decreased*, and *perverted* nutrition, — or *hypertrophy*, *atrophy*, *cacotrophy*.

We speak, in the first place of hypertrophy) This element of disease consists in the simplee enlargement of a part or organ, from an increase in the quantity of its natural or normal tissues. Thus, when a nerve or muscle enlarges, merely in consequence of an increase of its own normal tissue, it is said to be hypertrophied. The same remark may be extended to all the organs and tissues. It is quite improbable, that this hyper-nutrition can proceed very far without some changes in the quality of the tissue also; but it is certain, that in many cases, where it has proceeded to a degree incompatible with the healthy function of a part or organ, no qualitative change in the tissue can be detected. The muscles are perhaps more frequently than other structures subject to hypertrophy. One of the most important examples of this element of disease is hypertrophy of the heart. In no other muscle does this lesion produce changes of function so important and so inimical to the well-being of the system. Enlargements of the spleen and liver, thickenings of the cuticle (corns) and skin (elephantiasis), are also mentioned by writers as examples of hypertrophy. In these cases, we apprehend that there are other changes, in addition to the hypertrophy. The *cause* of simple hypertrophy is evidently an increase in the quantity of the nutritive fluid circulating in the part. The increase of the volume of a part, as indeed all the changes of the solids, may be regarded as *secondary* elements of disease dependent on *primary* changes in the blood. In normal nutrition, the plasma of the blood is effused, as it were, *guttatim*, in quantities sufficient

only for the growth and waste of the tissues. The quantities sufficient only for the growth and waste of the tissues. The quantity of this plasma may be increased to a certain degree, with this result only, that the part is hyper-nourished; but if the quantity be in still greater abundance, the solids cannot appropriate it, and a new or changed organization is the consequence, as *false membranes* and various other forms of organized lymph. It is scarcely necessary to argue, that an increase in the amount of the nutritive material is a *sine qua non* to increased nutrition or hypertrophy. To contend that there may be deposited from any fluid an increased quantity of materials without any change, quantitative or qualitative, in the fluids, would be equivalent to contending, that an effect may take place without a cause. The immediate cause of hypertrophy is, then, *hyperemia*; the remote causes are all those agencies, which produce determination of blood to the part. Thus, exercise hypertrophies, in some degree, the blacksmith's arm and the dancer's legs; but it is by increasing the amount of nutritive fluid in those members, that exercise produces this effect. The exercise of particular senses increases the size of the nerves of those senses, only by increasing the amount of blood circulating in them. Contractions of the orifices of the heart render more violent efforts of this organ necessary, in order to carry on the circulation. The result is hyperemia of the walls of the heart, which, in its turn, causes hypertrophy of that organ.

The *symptoms* of hypertrophy consist in the exaltation or increase of the forces, properties or functions of the

tissue or tissues of the seat the affection, and the functional changes of other organs associated with them. Thus, hypertrophy of the heart, when not caused by contracted orifices, may, in addition to the altered impulses and sounds of that organ, cause, also, derangements in the lungs, the brain, etc.—the result of the rush of blood, forced upon them.

The *treatment* of this element of disease consists *mainly* in the removal of the hyperemia. We say *mainly*, — because, in many instances, it is difficult, if not impossible, to reduce the amount of blood in an organ, to the degree necessary to the reduction of an hypertrophy, without too far compromising the functions of other organs. Hence, as in inflammation, other means besides blood-letting, dieting, and counter-irritations, become necessary. We have already alluded to the mode in which mercurials, the alkalis and the iodides act in that degree of active congestion, which, with its results, constitutes inflammation. They reduce the plastic power of the blood, and thus, and perhaps in some other mode, favor the absorption — the breaking down — the metamorphosis of the solids, and especially those of recent formation, which are less perfectly organized, and less capable of arresting the agents, which may be brought to act on them, than the normal structures are. Whatever may be the mode in which these medicines act, the profession is generally agreed, that they are valuable curative agents in inflammation and hypertrophy, and that they act by being absorbed and carried into the torrent of the circulation.

That *atrophy*, which is directly the opposite of hypertrophy, depends on a diminution in the amount of blood, will be disputed by no one. Of course, arterial blood is meant, when we speak of the blood as the nutritive fluid. Venous stagnation can neither cause true hypertrophy nor prevent atrophy. Whatever is capable of diminishing the amount of blood, circulating in an organ, acts as a remote cause of atrophy; amongst these may be mentioned want of exercise, the narrowing or obliteration of the blood vessels, etc., etc.

The *symptoms* are debility of the functions of the tissue affected. The *treatment* will consist in the employment of those agents and agencies, which we have noticed as *causes* of its antipodal state — hypertrophy; in other words, the treatment will consist in the employment of whatever favors the determination of blood to the part, — "*contraria contrariis curantur*." When the atrophy is general, and depends (as it always does) upon general anemia, or a condition of the blood unfavorable to nutrition, remedies calculated to restore and correct the blood must be resorted to, — remedies, to which allusion has already been made under the head of alterations of that fluid.

Amongst the changes of the solids may be mentioned certain alterations in their *consistence*. They are *softened* in some instances — hardened, or *indurated*, in others. There is always some softening in acute inflammation; and this softening is readily explained by the overflow of fluids, and the effusion of a fluid material, of which such parts are the seat. The softening thus produced by the

acute stage of the disease may end in *induration*, by the organization of the effused plasma. Thus the soft tissue of a granulating wound may be converted, in the course of time, into an indurated cicatrix. Thus it is, that in the commencement of adhesive inflammation of the liver, the organ is enlarged and softened, and that this state of the organ is gradually changed, as the fibrinous deposite contracts and becomes organized, into the opposite state of *diminution* of volume and induration. *Softening* may, in general, be said to be a result of acute hyperemia, — *induration*, a result of chronic hyperemia. But softening does not appear to result, in every instance, from hyperemia. It would seem, in many cases, to be the effect of *anemia* and those states of the blood, in which the fibrinous element is deficient, or not well elaborated. The softening of the heart, observed by Professor Stokes in typhus fever, is evidently attributable to this cachemia. The softening of the brain — *ramolissement du cerveau* — observed so often and described so well by Rostan, probably depends on anemia of the brain. *Softening* and *induration*, when acute, are to be relieved by correcting the states of the blood, on which they depend; when chronic, they are most generally beyond the reach of medicine, — the tissues are too profoundly altered to return to the state of health. Certain *transformations* of the tissues, described by pathological anatomists, as of cartilage into bone, fibro-cellular tissue into muscular tissue, and *vice versa*, evidently depend on the condition of the circulation. It may be stated, as a general rule, that when a tissue is *elevated* in the organic scale, by the

conversion of the fibrous into the muscular, it is in consequence of increased determination to, and activity in, the circulation of the part; and that, on the contrary, when a tissue is lowered, *degraded* from its station, it is in consequence of a decrease in the supply of the vital fluid. Qualitative changes of the blood have evidently something to do in these *transformations*. When ossification proceeds tardily in the infant, and leads to rickets, and when in adults, the earthy matters of the bone are absorbed and removed; or again, when ossific deposites takes place in the vessels, there is evidently something more than a plus and minus of blood to be considered. There is evidently some *qualitative* change in that fluid, consisting mainly, perhaps, in a diminution of the phosphatic salts in the former cases, and an increase of them in the latter. It is confirmatory of this view, that the phosphates of soda and of lime have been found serviceable in cases of molities ossium and rickets.

We proceed to the consideration of certain chronic effusions, which undergo various degrees of organization in the parenchyma of organs. These effusions do not retain the fluid form, as dropsies, though they result from the same state of the circulation. They become solidified in the interstices of the organs. They take place slowly, and in small quantities, and are surrounded by, and in close connection with, the absorbent veins and vessels, which absorb their more fluid portions, leaving, as a sort of debris, their solid portion. These deposites, as they are called, do not consist in the increase of the volume of any tissue; they do not change the nature of any tissue;

they constitute a new, an additional tissue. They are formed, as all tissues, from a matter derived from the blood. They are the plasma of the blood, variously modified. They result from an overflow of the blood — from local hyperemia of the organs, which become their seat. They consist of the same *material*, which, in a normal state of the circulation, repairs the waste of the tissues. They constitute *deposites*, only when their quantity is excessive, with or without changes in their quality. These effusions are identical with those, which take place in common inflammation. In common inflammation, the serum of the blood, containing albumen and fibrin, is effused. This effused plasma may organize in the form of *false membranes* — of fibrinous bands; or it may unite the lips of a wound and form the substance of a cicatrix. In these cases, the deposite is said to be *euplastic* — that is, the effused plasma is, in its nature and composition, healthy, and capable of being organized into tissues analogous to those, which compose the organs. But this plasma, this nutritive material of the blood is not always in that high state of elaboration, necessary for *euplastic* formations. It is often of an inferior quality. Owing to bad digestion, to imperfect hematosis, to insufficient or deteriorated food, the resulting nutritive materials of the blood are not well made. They are inferior in quality, and when effused, constitute a sort of degraded, semi-vitalized plasma, or cytoblastema, which assumes a low degree of organization, or perhaps no organization at all. Deposites, produced under such circumstances, are properly enough termed *cacoplastic*, or *aplastic*, according as

they manifest a low degree of organization, or an absence of any sign of organization. These degraded effusions constitute the various forms of tubercle, the matter of scrofulous deposits, the typhus deposits, as found about the glands of the intestines, those of the mesentery, etc. They produce the change in the structure of the kidneys, termed the *Morbus Brightii;* the change in the liver, known as adhesive inflammation of that organ, or *cirrhosis* — and in short, all those formations, which have been recognized as tubercular in the lungs, brain, intestines, liver, and the organ and parts generally.

Is, then, the plasma of the blood, which nourishes the tissues, identical with that, which is effused in inflammation or active hyperemia, forming the *euplastic deposits;* with that, which is effused in the lungs and other organs, constituting phthisis and tubercular diseases in general; with that which is effused in the liver, constituting cirrhosis, or in the kidney, constituting the morbus brightii or granular degeneration of the kidneys? Is it the same plasma of the blood which formed, when effused, all these various deposites? Most certainly. Whence, then, the differences in the degree of organization, and in the forms which these deposits assume? These differences result from the variations in the quality of the plasma, and the texture of the tissues, in which it is effused. Such conclusions may be regarded as the offspring of mere *a priori* speculation. We acknowledge, that we arrived at them by reasoning on what we felt confident were established facts in physiology and pathology. We saw clearly, that such conclusions ne-

cessarily resulted from the premises we had adopted. But not on reasoning alone do the conclusions rest. They have been pretty well established by direct observation. The microscope has demonstrated, that the morphological differences between the effused plasma in inflammation, and the lowest grade of tubercle, are only such as the greater organizability of the former would lead us to anticipate; and that the effusions of typhus fever and phthisis and scrofula are the same.

It is now universally conceded that the materials, which go to form these various deposits, are effused in an amorphous fluid state. Granules, nucleoli, nuclei, and perfect and imperfect cells are observed, in a short time, formed and forming in this amorphous stroma: that is to say, the effused cytoblastema in virtue of its inherent properties, influenced more or less by its contact with the tissues, undergoes a degree of organization of a higher or lower grade, according to the quality of the fluid blastema.

According to Vogel, and the many authorities which he quotes, the structure of tubercular masses, as observed under the microscope, varies considerably. In some, the cell-genesis appears tolerably complete and abundant; in others, the cells are not well developed; in others, again, there is a mere granular mass, imbedded in an amorphous and apparently non-organizable stroma. These differences, doubtless, depend on the quality of the material effused. In some cases, it is not so far degraded as to be incapable of at least a low degree of organization — (*the cacoplastic.*) In other cases, it is capable of no organiza-

tion at all — (*aplastic.*) Such are the differences observed in the *grey tubercle* and the yellow — the latter being a lower product, and exhibiting only granules; whilst, in the former, nucleated cells are recognized. The same general structure, with the variations, is observed in typhus and scrofulous deposit, evidencing the identity or close analogy of all these epigneses.

We have already alluded to some of the changes, which these deposits undergo. The causes, which first produced these effusions, remaining, they may grow or increase in amount, from the constant addition of analogous matter. This may take place in those deposits, which posses only the lowest grade of organization, or even none at all, the growth being as that of calculus in the bladder, stratum super stratum. But it is not impossible, that, when the cytoblastema has a high degree of organizability, the resulting cell formations may themselves increase and multiply; or at any rate, that the deposit may be capable of some degree of interstitial growth. If this view be correct, the question, is tubercle an organized body? is settled by a sort of compromise; and the answer is, that sometimes it is, and sometimes it is not, depending upon the organizability of the plasma, of which it is formed. Further: by the action of absorption, tubercular masses, which at first possessed some degree of organization, may be deprived of their more fluid parts; then of their animal constituents, and finally converted into mere chalky masses, which are certainly inorganic.

There can be no doubt, that these deposits are some-

times entirely removed by absorption. This is one of *Nature's* modes of curing consumption. How often this may take place, it is impossible to say; but we observe it frequently in the subsidence of scrofulous swellings of the neck and other parts, which are visible. No one will dispute, that the typhus deposit may be removed by absorption; and though, from the circumstances of the case, we cannot demonstrate the absorption of tubercles, reason and analogy force us to the conclusion, that they are occasionally absorbed. More frequently, however, these masses undergo a sort of disintegration or decomposition, in consequence of their loss of the low degree of organic power they may at first have possessed; or this change may be due in part to the afflux of fluids, which they, acting as foreign bodies, may excite in the neighborhood. They soften, excite fresh irritation in their vicinage, and lead to various changes in the structures, in which they are situated. When in the lungs, they cause circumscribed pneumonias and pleurisies, and, when thrown off by the cough they excite, leave cavities of various forms and sizes, which remain the seats of active congestion, and its results, the effusion of plasma, the formation of pus, and perhaps of fresh tubercles. When the deposit is limited to a very cirumscribed portion of the lung, and when the state or states of the system, which produced the deposit, have ceased to exist, it is easy to conceive how, by softening and expectoration, the deposit may be got rid of, and how the resulting cavity may be healed by the effusion and organization of a healthy lymph. This is another mode, in which

Nature cures consumption. Tubercular and analogous masses in other organs may be removed in a similar way, — an *abcess* forms around them, which finds its way to some surface, on which are discharged both the tubercular matter and the pus.

What are the states of the system, which *cause* these deposits? All agree, that they come from the blood. When the deposite is *euplastic*, as in false membranes, cicatrices, etc. etc., active congestion is sufficient to account for it — active congestion, supervening in a healthy state of the system. But when the deposit is cacoplastic or aplastic, it is plain that the blood cannot be in a healthy condition — that its state is abnormal. But we need not rely on reasoning, when direct observation is at hand. The fact is, that the blood has been found to be altered in these cases; a condition of that fluid, analogous to that which we have desbribed as characterizing general anemia, has been observed. There is a diminution of the amount of the red globules, the amount of the plasma of the blood remaining the same as in health, or being somewhat increased; and there is evidence, in the feeble contractility of this plasma, of its imperfect elaboration. This is the "*stuff*," of which tubercles are made. The blood, thus changed, does not circulate so freely as healthy blood. Indeed, any change of blood from its healthy standard favors congestions, as the experiments of Magendie have shown; and this brings us to the question — is congestion, as well as the cachemia just noticed, necessary to tubercular effusion? It is, we think, for the following reasons:

First. All admit, and it is clear, that congestion favors the effusion of blood itself, or any of its constituents.

Second. In inflammation there is an increased amount of fibrin in the blood, but it is poured out only in the inflamed or congested part. If congestion were not necessary to effusion, the fibrin might as well have been effused elsewhere.

Third. Obstructions to the circulation cause congestion, and consequently effusion of the watery portion of the blood, constituting dropsy, if within a closed sac; and it is not difficult to show that dropsy is, in every case, the result of congestion, active or passive. The argument is this: If congestion be necessary to the effusion of the water of the blood, that portion of the blood most easily effused, *a fortiori*, it is necessary to the effusion of the fibrin of the blood, that portion of the blood which is not so easily effused, as the watery element.

Fourth. It is well known, that the supervention of congestion in an organ, the seat of these deposits, leads to a "fresh crop" of them.

Fifth. It is known, that all those measures which favor a free peripheral circulation, and thus protect the lungs from congestion, tend to prevent the effusion of these deposits in the pre-disposed. Amongst these measures may be mentioned warm clothing, a residence in warm climates, counter-irritation, etc.

We might quote the highest authorities in favor of the doctrine here advanced, but we do not wish to load these chapters, with the mere opinions of writers; and we have not the space necessary for all the facts and reasonings, by

which those opinions are established. We write for the sake of giving our own views, and we wish to do this in as brief a manner as possible. There is no easier task than to write octavos, made up of extracts from authors. There is no task more profitless — if not to the author, at least to science — than such compilations.

The deposits and the states leading to them are recognized by the local and general abberrations of functions, to which they give rise. Of the general symptoms, we need add but little to what has been already remarked. They are the symptoms of anemia, or of that condition of the system, of which anemia is a principal element. Such a state constituting the predisposition to these deposits, no description of a general character would apply to every case. It is sufficient to say, that there is a general debility of the functions. The local symptoms and signs are too varied to be recorded here — depending on the seat — the amount of the deposit and the changes, which the deposit and the organ undergo; in a word, upon the infinite varieties of injury, which may be caused in the structure of the various organs. For example: in the commencement of the tubercular deposit, there is but slight change in the functions of the lungs. The breathing seems normal and the presence of the tubercular matter is revealed by no physical sign; a certain amount has to be deposited before there is dyspnea, even after active exercise, or the prolonged expiration; these however, show themselves as the deposit advances; tubal respiration, and the rales succeed; and finally, side by with symptoms of general exhaustion, the cavernous

rales, pectoriloquy and other physical signs of disorganization of the lungs are apparent.

In the treatment of these deposits, three things are mainly to be considered. The general state of the system, depending on the quality of the blood; the local hyperemia, without which the deposits could not take place; and the deposit itself.

To relieve the first two states would be to prevent the deposit from taking place, or arrest its further progress. How is this to be done? The cachemia, which seems to be mainly anemia, is of course as already indicated to be remedied by a tonic regimen and by tonic remedies. These have been mentioned. The local hyperemia is also to be treated as described under the head of inflammation and passive congestion. To prevent congestion, the blood should be maintained in normal qualitative state. There can be no doubt, that the beneficial effects of warm climates in arresting the tendency to phthisis depend upon the fact, that such temperature keeps up an active peripheral circulation, and thus prevents internal congestion. Warm clothing and the various counter-irritants act in the same way. To prevent the general cachemia and the local hyperemia is to prevent the deposit.

What is to be done, when the deposit evidently exists? Just what is done before it exists. Combat the two elements, which gave birth to it; improve the general health; relieve the local congestion. One or both of the indications always exist, and the presence of the deposit only affords a third indication. Will not the deposit be re-

moved, if the general and local states of the system, on which they depend, are removed? Perhaps so; but certain remedies are thought to have the power of facilitating their absorption and removal. Of these are the iodides, the alkalis, cod liver oil, naptha and several others. But do not these remedies act through the blood by altering its quality? Most assuredly they do; but the question is, whether the bringing of that fluid to its healthy state, qualitative and quantitative, would be sufficient to remove these without the medication of it by any of these agents. There can hardly be a doubt, that tubercles and other similar deposits are sometimes absorbed and removed either by the unaided efforts of nature or by these efforts aided by appropriate medicines. The same main indications exist throughout the entire course of these diseases. It is always an object to improve the condition of the blood, to maintain its equilibrium, to promote the absorption and elimination of the deposits and to prevent additional formation of them. Thus, when there is a tubercular cavity, the hope is that the circumjacent lung may be sound; and that the cavity may heal, if by the means above mentioned additional deposit can be prevented, or the absorption of that, which may exist, be facilitated. We shall not discuss the relative merits of these agents supposed to possess the power of dissolving or otherwise removing tubercle and other deposits. Suffice it to say, that there is cheering evidence in favor of the doctrine of their curability and of the efficacy of the agents just named.

We proceed to the consideration of tumors, or changes

of the solid structures analogous to those caused by the deposits. The difference, the only difference, seems to be this, that the deposits are not possessed of independent vitality, and the power of interstitial growth, which may be asserted of tumors. Tumors seem to be a sort of parasite, which may have laws of development peculiar to themselves, though they draw their support from the part, in which or on which they seat themselves. But is it certain that the deposits, some of them at least, have not this faculty of separate growth also? And is it proved that all tumors have? Perhaps, after all, the principal distinction between the deposits and tumors is to be found in the seat and shape of these morbid products; for a tubercle, if seated beneath the skin and of a certain size, would certainly be properly called a tumor.

Tumors have been variously classified. They have been divided into the non-malignant and the malignant, or into those which exert no deleterious influence on the general system, and those which do. Vogel divides them into two classes also, the *analogous* answering to the non-malignant, and the *heterologous* answering to the malignant. Lebert employs a similar, but we think a better, classification of *homœomorphous* and *heteromorphous* tumors. By the homœomorphous he means all those tumors or growths, which consist of the same material, which is found in some part or some stage of the healthy system, as collections of fat, of epithelial cells, of fibrous structures, etc., etc.; and by heteromorphous, the various forms of cancer only. Under the first head he includes corns, which are but thickenings of the cuticular struc-

ture; condylomata, which are but enlargements of the papillæ; elephantaisis, which is but a hypertrophy of the skin; the encysted tumors (atheromatous, melicerous, etc.), which are but enlargements of the sebaceous glands, caused by a stoppage of their orifices; the tumors of the ovaries from enlargements of the Graafian vesicles, the fibrinous tumors from effusion of blood in a part, the fluid parts of the blood being absorbed; the erectile tumors, which are but bundles of blood vessels with their effusion; fibrous or fibroplastic tumors, which are almost identical with the fibrous structure found in health. Such is an outline of the "*tumeurs homœomorphes*" of LEBERT. Under the same head are, of course, included enlargements of the mammæ and all the various forms of osseous and cartilaginous tumors. Cancer constitutes the entire class of his heteromorphous tumors; of this there are various forms or varieties, but they all agree in presenting the same specific cells or cancer germs. These latter sometimes exist in great abundance unmixed with homœomorphous tissues. Sometimes they are imprisoned in a web of fibrous structure more or less dense. Schirrus differs from encephaloid only in the greater abundance of cancer cells, and less amount of dense fibrous matter in the latter.

These cancer cells are nucleated; they are much larger than the white corpuscles of the blood; much larger than pus corpuscles. They are always, according to LEBERT, found in cancer; indeed they constitute cancer. Whence are they, and what is the cause and mode of their genesis? The first question is easily answered; they are from the

blood. The second is a mystery, which will be perhaps not soon revealed. Are these cancer cells *formed* in the blood? They could not, being so large, be effused from the unruptured blood vessels. They are then formed, like the cells of the deposits, in an amorphous stroma effused from the vessels. What is it in the nature of the effusion, which causes cancer cells rather than tubercle cells to be generated? This question cannot be answered. May not the cancer cell be a sort of parasite, a sort of entozoon, the result of a spontaneous generation? Alas, that in pathology there are so many unanswerable questions!

The medical treatment of tumors is to be conducted on the same principles, which guide us in the management of disease in general. Compression, which renders them anemic, will often cause their disappearance. Diminishing the supply of blood in any other manner will produce the same effect. As in the deposits, so in these some medicines seem to have the power of causing their absorption. Amongst them may be mentioned especially the iodides. The Surgeons knife is the most efficient remedy in many cases, the only one in some. It is certainly good practice to employ it, though very often, as in cancer, the malady may return or attack some other part or organ. The operation affords the sufferer the only chance of life and protracts existence, if it does nothing more, in the numerous cases, which it cannot save from a fatal termination.

Of luxations, of fractures, and, in general, of lesions of the solids caused by chemical agents or mechanical vio-

lence, it would be out of place to speak in this mere *coup d'œil* of general pathology. Suffice it to remark, that even these agencies, which act on the animal system just as they act on unorganized matter, cause, in addition to the direct lesions of the solids, some change qualitative or quantitative (or both) of the fluids. Most frequently they produce *active congestion* and its results.

CHAPTER XII.

NOSOLOGY.

There can be no classification of diseases, which is true to Nature, except the simple arrangement of the elements of disease, as adopted by Andral, Williams and most modern writers on general pathology. Hyperemia or congestion may be considered as a genus, of which active and passive congestion are species. Changes in the composition of the blood, however induced, may be considered as another genus, of which each particular change in that fluid may be regarded as a species; changes in the solids may be also regarded as a genus, of which hypertrophy, atrophy and the various deposits may be called the species. This, however, amounts to no more than the formula, that diseases consist in certain changes in the quantity and quality of the fluids and the changes of the solids consequent thereon. This classification of the elements of disease, applied to special pathology, renders it necessary to state in each individual case the elements, which make up the special disease; and though this might not be capable of being done by any single term or name, the idea would be true to Nature. In

every case, it would behoove the physician not to find a name or a class for the disease, but to state its nature by enumerating its elements. Special diseases, which are ever varying groups of these elements, would thus be estimated aright, for the degree and extent as well as the kind of each element would be taken into consideration.

Well selected terms to express these groups are *desiderata*. The word *fever* gives no idea of the intimate nature of a disease, the word *anemia* does. But before we seek for a nomenclature, we should become acquainted with the things to be named. The nomenclature of general pathology, founded on a considerable degree of such knowledge, is, therefore, very appropriate. Hyperemia, anemia, etc., express the nature of the states, to which they are applied. A sort of compound terminology, made up of the names of the elements of disease, to apply to those compounds of the elements termed special diseases, has been suggested by Piorry; for example, Enterite Typhohemique for Typhoid Fever, Cholihemia for Jaundice, Hepatohemia for Congestion of the liver, Hypersplenotrophy for enlargement of the spleen, Encephalorhagy for Hemorrhagy of the brain, etc. We cannot but approve of this. If we must have names for complicated things, those names must be long and complicated to express these things. The names of the elements of disease are generally well selected, and they indicate the nature of these elements. But a special disease may be made up of a dozen of these elements; a term to express such complications must necessarily be

"of learned length and thundering sound." Perhaps it will be found impossible, by any compound term, to express the elements of the more complicated diseases. Chemical combinations can be easily represented by these compound terms, but disease is often too complicated for them. In such cases a description will do. It certainly is not necessary to the perfect understanding of the constituent elements of a given disease, that one word be made to express them.

We approve of the terminology of Piorry; but it can never so completely apply to special diseases, as the terminology of the chemist does to chemical combinations.

In order to the classification of diseases or any objects of research, an intimate acquaintance with the nature of the things to be classified is necessary; next an appropriate nomenclature; and we unhesitatingly say, that so far as disease is concerned, this is all that is necessary or even practicable. To investigate and name the elements of disease, to find out and name appropriately the combinations of these elements, which form special diseases, what other classification is needed? what other is practicable?

The classifications of disease, which have hitherto been proposed, are not true to Nature. Disease does not observe the barriers of *classes* and *orders*, *genera* and *species*, as proposed by methodical nosologists. It would hardly be going too far to say that no one disease, arranged in any one class, is rightfully confined to that class. What would be thought of a zoological classification, in which one animal belonged equally to every class! We not

only assert, that the classifications of nosologists have been without good results, but we go further and contend, that they have injured the cause of science, and that they have confused rather than illuminated the subject of special pathology. If we can prove, that they are false transcripts of Nature, we will have proved this. Let us look at some of them. Take the class *Pyrexiæ* of Cullen. This includes Fevers, Phlegmasiæ, Exanthemata, Hæmorrhagiæ and Profluvia. Now, in the first place, there is no increased heat or *pyrexia* in many of these diseases, as in some hemorrhagies and fluxes, but even the contrary, a great diminution of heat, *ab initio*. Moreover, in nature the Phlegmasiæ are constantly complicating the Fevers, though they are separated as different orders by Cullen. Nature hath joined them together, though nosologists have put them asunder. Is it meant by these nosologists, that there can be but one disease in the system at once? that however complicated may be the elements, all of them constitute but one disease? If so, it is clear there are many diseases, which belong to every one of their classes and orders. What would be thought of a botanical classification, in which one plant belonged to every order! Or, if they mean to say that each element is a disease, then the classification falls back to that of the terminology of general pathology just alluded to,—the Anemias, Hyperemias, Atrophics, etc. Cullen's second class, *the Neuroses*, embraces the Comata, Adynamiæ, Spasmi and Vesaniæ. But one disease in the order Spasmi,—Epilepsy, for example, covers the whole class, for it leads to Coma, and it is attended by Spasms

and Adynamia or weakness of both mind and body. And after all, the whole class is made up of symptoms, and not diseases. Is Spasm a disease or a symptom? Is Palsy a disease or symptom? Does not Pertussis, which is arranged in the order Spasmi, leave the order and even the class and go into the class Pyrexiæ and orders Febres and Phlegmasiæ, and find itself as much at home there as anywhere else? Mania belongs to the fourth order Vesaniæ, of the class Neuroses. But in Mania, there is generally both Inflammation and Fever; and it might better be placed in the order Phlegmasiæ; but better still in no artificial order at all. In the class Cachexiæ, we have the orders Marcores, Intumescentiæ, and Impetigines. Throughout all these orders there is a confusion of diseases and symptoms. Tympanites is called a disease and placed in the order Intumescentiæ. Dropsy is called a disease and placed in the same class. Jaundice is called a disease of the skin and put in the order Impetigines. The fourth class, Locales or local diseases, embraces as orders Dysæthesiæ (diseased senses), Dysorexiæ (depraved appetites), dyscinesiæ (depraved motion), Apocenoses (increased discharges), Epischeses (obstructions), Tumores (tumors), Ectopiæ (displacements) and Dialyses (division of parts). Let us see. Nearly all the diseases enumerated in this class (with so many orders) are but symptoms, v. g.; Bulimia (depraved appetite), and Polydipsia (inordinate thirst). Who would have thought of finding Nostalgia or home sickness in the order of False Appetites, of the class Locales? Perhaps it was placed there, because the per-

son affected often loses his appetite and desires "a local habitation", home!

We have said, that nosologists classify symptoms as diseases. But it may be replied in their defence, that, at the time they proposed their classifications, symptoms were called diseases, or a bundle of symptoms was called a disease, and the state of the system producing these symptoms was called the *proximate cause*. Very well. This would be an adequate excuse but for the fact, that they have enumerated what they called proximate causes and what they called diseases together. For example, the order Phlegmasiæ includes the Inflammations; and yet we find in the other orders and classes the mere symptoms of Inflammation classed as so many diseases. So that there is no excuse, let the terminology be what it may. Things different in their nature have been classed in the same category; symptoms and diseases have been classed together, or, in the language of former times, proximate causes and diseases have been classed together. It is as if we should arrange together *as tissues* of the body the *areolar*, *muscular*, *nervous*, *sensibility*, *irritability*, *secretion*, *etc.* It is a confounding of the *categories* (the *substantia* with the *actio*,) — as Logicians call them. Thus it is with these nosologies. Things closely related to each other have been widely separated; things having no affinity have been approximated. A false map has been given of the field of Medicine, which must be thrown aside before the topography of that field can be understood. It is a little amusing to find Cullen complaining of Lieutaud, that he

had classed pain, a mere symptom, as a disease, after reading Cullen's classifications, which consist mainly of symptoms, as palsy, melancholy, palpitation, etc., etc., etc.

The classification of Good is still more complex than that of Cullen, and equally objectionable. He has elevated every symptom to the rank of a disease, as, for example, *hiccough*, *sneezing*, *palpitation*, *twinkling of the eyelids*, *twitching of the tendons*, *etc.* If physicians and dictionary makers had agreed to call every symptom a disease, and if forty or fifty diseases might affect the system at once, Dr. Good's classification might do well enough, but for the fact, that he has mingled up with his classes of symptoms, those states which cause them, and which are now generally called diseases. For example, he enumerates inflammation and various other organic alterations as diseases. He confounds *states* and *actions*, *altered anatomy* and *altered physiology*, *diseases* and *symptoms;* and we are free to assert, that his classification is calculated rather to obscure than to illuminate the subjects of which he treats. It would be as easy to learn the conjugations of the Greek verbs as to learn his table of classification; and, when learned, it would prepare the student rather to misunderstand than understand Pathology, either General or Special.

Darwin includes all diseases in four classes, viz: those of *Irritation*, of *Volition*, of *Sensation*, and of *Association*. It would require too much space to give examples of his classification and expose its objectionable features. Suffice it to say, that his diseases are mostly what are now

called symptoms, as *decreased irritation*, *increased irritation*, *increased sensibility*, *decreased sensibility*, etc. He ranks *grey hairs* and *cataract* together, as belonging to one of his genera of disease of the class *Irritation;* and *want of thirst* (Adipsia) and *accumulation of feces* (accumulatio alvina) are diseases of the same genus, of the class *Sensation*. *Chewing the Cud*, *Cholera* and *Hydrophobia* are ranked together as of the same genus. Darwin's classification may be said to include all the possible changes of function, which the system can present; in other words, all the *symptoms* of disease, and also such diseases as Scirrhus, enlarged Spleen, etc. Now all these thousand or more diseases of Darwin are embodied by the simple proposition, that all the actions of the system may be *increased*, *decreased*, and *perverted*, as secretion, sensation, etc.; and to enumerate all these changes of function would be to give a table of Darwin's classification of diseases. We repeat, that, if physicians agree to call every altered action of the system a disease, and if they agree to call the states of the system producing these changes of function the proximate causes of disease, then Darwin's classification would do well enough but for the fact, that he has confounded the *proximate causes and the diseases*,—what are now called *diseases* and *symptoms*. If we pass by the various other nosologies, as those of Sauvages, Pinel and others, it is because they differ in no essential respect from those already noticed.

The groups of elements, as they combine in the human system, are incapable of classification; they are too protean and multiform. We mean, of course, a classifica-

tion true to Nature. A false, artificial classification can be made, and has been made again and again. We can classify the elements, not their groupings. Dr. Bartlett, in his Philosophy of Medicine, contends that this can be done, and endeavors in some measure to perform the task; but his classification is but the classification of the elements of disease, after all.

Thus, he divides the Fevers into two families, the one including the Exanthemata, the other the Intermittent Remittent, Typhus and Typhoid fevers. Very well. But Typhus and Typhoid might as well be placed in the first family as the second. And, moreover, these fevers are, so far as we know any thing of their essence, but changes in the quality of the blood, complicated, it is true, for the most part with supervening inflammation; so that the mere classing of the essential fevers together is no more than classing the elements of disease. The fevers are but a portion of our *qualitative changes* of the blood. "Another great family, says Dr. Bartlett, is found in the Phlegmasiæ." But inflammation is a species not a family. It is one of the congestions and its results, and it belongs to the quantitative changes of the blood, or Andral's lesions of the circulation. It is true, that Dr. Bartlett contends that there are many species of inflammation, that inflammation of the brain is a different disease from inflammation of the lungs. But we are disposed to regard it as the same disease, differently located. He might as well say, that the horse in the meadow is a different species of animal from the horse in the garden. If inflammation of the brain is a

different disease from inflammation of the lungs, then congestion of one twig of a vein would be a different disease from congestion of the adjoining twig, and half a dozen or rather a hundred diseases would be caused in the arm by a bandage above the elbow. Tubercle in the pleura would be a different disease from tubercle in the lung. Indeed, according to such reasoning, each tubercle would constitute a separate disease, for each must have a different location. An M is an M, whether it be found in "Macedon or Monmouth." Dr. Bartlett's family of Phlegmasiæ sinks, then, to a species of our own elemental classification of *quantitative changes* of the blood. His family of Neuroses are nothing more than symptoms, as Hydrophobia, Tetanus, etc.; and pathologists do not agree as to what element of disease or combination of elements produces these various symptoms. So that Dr. B., though he set out with the belief that special diseases are capable of being classified, as the objects of natural history are, falls back, when he makes the attempt, to the simple elemental classification, which is in substance that for which we contend. Indeed, he virtually admits the impossibility of the task, when he speaks of those diseases, which cannot be domiciliated in any of the families—those vagrants, that hang about the boundary lines of the classes. His quotation from Whewell to the effect, "that we can classify the trees on two hills, notwithstanding the scattering ones in the hollow," tends to the same conclusion. Still farther, he admits in so many words, that these families of diseases cannot be referred to any great primary orders and class-

es, as the Vasculares and the Cellulares, the Endogens and the Exogens in the natural system of Botany. Nosologists have been cheated into the attempt of classifying special diseases by the idea, that the states of things are as stable and as unvarying as the things themselves. In natural history, the objects remain always the same. But the states of the system or diseases in their endless and ever varying combinations, like the prospect of a kaleidoscope, rarely present any two views alike. The fact, that Dr. Bartlett has failed to give anything like a satisfactory classification of special diseases, is, of itself, no inconsiderable evidence of the inherent difficulty of the task.

Rush's doctrine of the unity of Disease and Broussais' antipathy to nosological ontology were extremes, indeed. But they were far more favorable to thought and to Science than the systems of Nosologists.

All that we can do, all that is needed in the present state of science, is to give a simple and expressive nomenclature and classification of the elements of disease, and a compound nomenclature, as that of Piorry, for the combinations of these elements or special diseases; or, in the absence of such a compound nomenclature, a brief description of the various special diseases, in which every element will be named. This leads the physician to endeavor in all cases to estimate these elements and to note their changes; and such an observation of them alone can enable him to rightly diagnosticate or skillfully treat them.

CHAPTER XIII.

MEDICAL DOCTRINES.

Nothing can be more pleasing and encouraging to men engaged in any pursuit than the fact, that their predecessors have been eminently successful in the same pursuit — nothing more discouraging than the conviction, that those who have gone before have succeeded badly. It would be an inducement for us to set out on a fresh voyage of discovery, with new hopes and energies, if it can be shown that those who navigated the same seas in past ages have invariably returned laden with richer treasures than the golden fleece of the Argonauts. To drop the figure — it will be a new and powerful incentive to study, if the fact can be established that those, who have in times past performed the labor of thought and research, have been amply rewarded by the discovery of truth.

We propose, then, in conclusion, to notice briefly the principal medical theories of the past. Nothing can be more interesting to the cultivator of medicine, to him who has been accustomed to laborious thought on the intricate subjects embraced by the study of his profes-

sion, than the views, the thoughts, the theories of those who have preceded him in the same vast and extensive field of research, the same many chambered labyrinth of nature's secrets — nothing can be more interesting than the theories of the past. The saying, that doctors will differ, and which has grown into a proverb, is thought by many to be peculiarly applicable to doctors of medicine. It applies as well, however, to those of other learned professions. Many persons seem to regard it as an established fact, that the doctrines of our profession are but a tissue of contradictions and uncertainties, hardly worthy of examination, as "the illusive bubbles of an hour," passing away almost as soon as formed, to be followed by others equally frail and transitory. We are indebted in some degree to the poets and novelists — those children of fancy and wit — for this popular idea of the medical profession. Every one, almost, has something to say of a *doctor*. Moliere had his "Medecin Malgre lui" and his "Purgon," and Le Sage his "San Grado" and "Cuchillo." A science and art so deeply rooted in nature and truth, and so obviously beneficial to mankind as medicine is, can, however, smile at the ridicule of witlings, who are always glad enough to implore its aid in the hour of suffering and danger. But are medical theories so discordant as they have been supposed to be? We are inclined to the opinion, that mainly they are reconcilable with each other, that they are in their principal features harmonious — that their differences are more apparent than real, and often more in words than things. They seem at a cursory glance, it

is true, to differ on almost every subject. Even the value of thinking or theorizing has been a subject of dispute amongst medical men. Some have attached great importance to theory in medicine — others have decried it as useless and even injurious in its bearings on practice. But evidently here the difference is mainly verbal. No one would dispute the value of *thought and reason* as means of arriving at truth in medicine as in other branches of human research. To dispute this would be to question the value of mind,—of intellect, in scientific investigations. Those, who have advocated the value of theory, advocated only the utility of thought; and those, who have decried theory, meant only to protest against the visionary speculations that have been called by its name. No one ever denied, that it is useful for the physician *to think;* and to think is to theorize. The object of the physician then — the object of all physicians — of all countries and times—has been to arrive at the best, the true theory. We can scarcely doubt that all have agreed in this — and to the value of theory thus defined. But have the theories of the great masters of our art differed so much as we ourselves have been in the habit of supposing? The more we examine them, the further we shall be from so unfavorable an opinion of them. The objects of study — the human system — its organization and its functions in health and disease, have been the same in all countries and ages — the same in "Lybia, Delos and Scythia," the same when Hippocrates wrote as at the present time. The human mind has also been always the same — so that objectively and subjectively

medicine has been the same science at all times. But the science is vast and the mind is limited. The objects are multiform, and the mind is disposed to but *partial* contemplations of them. "*Art is long and life is short*" — we do not seem to have time enough to impress our minds with all the phases of science — to give to each one of them the deserved attention — one phase has attracted one mind — another phase another mind; one theory embraces this portion of truth, another that. Here and there a vast intellect seems to grasp the whole, but it attaches, or seems to attach more importance to some one element than that element deserves in the estimation of another comprehensive intellect that seems to grasp the whole. It would be vain to deny that real differences and contradictions are to be met with in the history of medical opinions; but what we contend for is this: that the seeming differences, which constitute the larger portion, disappear on a close examination of them.

Two causes appear to have contributed mainly to the apparent discrepancies in medical theories:

First. The attaching of different meanings, or shades of meaning to the same words.

Second. Partial views and examinations of subjects in their nature and extent, complex and vast.

We have noticed an example of the first cause of apparent difference in the term theory, as differently understood. Dr. Bartlett has written a work, *The Philosophy of Medicine*, to prove that theory is useless in medical researches. All that is necessary, he says, is to collect facts

and *arrange and classify them* — but have no medical doctrine! Now, all that we mean by theory or medical doctrine, is a judicious arrangement and classification of facts and the inferences which flow naturally and necessarily from them. "A rose by another name will smell as sweet." The quarrel of the ancient dogmatists and empirics amounted to no more than this. As another example may be mentioned, the different meanings attached to the word *disease*. Some employing it as meaning an altered *condition* of the system, and others applying it to the *actions* of the system. Some meaning by it altered anatomy, and others altered physiology, and others again both, thus confounding it with the word symptom. What one author has called a *functional disease*, meaning thereby a disease in which there is no *appreciable change of the solids*, another has called organic, meaning that there must be in every disease some change in the blood or solid, or in the equilibrium of the two, and this the former would not dispute. We have in a former chapter remarked upon the various uses of the word disease and symptom, which cause apparent discrepancies in medical doctrines. Thus in the Nosologies of Good and Darwin the student finds a great number of diseases not mentioned in other authors,—the explanation is that Good and Darwin termed every symptom or alteration of function a disease, whilst others called those states only diseases which Good called the proximate causes of disease.—With this key — a knowledge of the different uses of the words symptom and disease — We can unlock the mysteries of methodical nosologists — with this thread we

can traverse without confusion the labyrinth of all the intricate classifications of authors. To this we have already sufficiently alluded in the preceding chapters.

The second cause of apparent discrepancy is of far more extensive application. In the infancy of our science, it was not to be expected that the entire philosophy of medicine could be grasped by any one mind; and it has been by degrees and with much importunity that Nature has been induced to reveal her secrets. But what she revealed two thousand years ago she attests now, and will attest evermore; what Hippocrates and Themison clearly saw and described, is yet as clearly seen. The truths, that Galen taught, command our faith now. The theories of Haller have not passed away. The main features of the systems of Bœrhaave, Sydenham, of Hoffman and Cullen, are still recognized by the calm contemplators of nature. Brown, "the child of genius and misfortune," was so enraptured with one or two truths, that he never found time to look at any others — but his truths are nature's teachings. Rush gazed with a vision of more than ordinary strength on the temple of medical truth, and described its swelling dome, and majestic columns with more than ordinary eloquence; but he did not view it in all its parts. Broussais, one of the best minds of any age, seems to have seen half of it, and to have become entranced for life with the sight.

The poet of nature has said, of the different portions of the universe, that "*all are but parts of one stupendous whole.*" This expresses very nearly the idea we wish to convey of the various medical theories of ancient and

modern times. They are parts, not discordant parts incapable of harmonizing with each other in the framing of the great temple of medical science, but like the different beams and blocks, and pillars fashioned by the architects of old, from the forests of Lebanon and the quarries of Zeradetha, ready to be used in the construction of the glorious edifice, and scarcely requiring the sound of the hammer. To illustrate this assertion by a few examples — HIPPOCRATES taught, that disease consists in a morbid state of the fluids, and that Nature tends to cure or ameliorate it by certain evacuations as of sweat, urine, etc. He was a humoral pathologist in the fullest sense of the term. We say nothing of his four elements — of his four humors and temperaments, with their hot, cold, moist and dry, which strive for mastery, as champions fierce, and "to battle bring their embryon atoms." His theory was tinctured with the philosophy of the times — but even in his philosophic details, if we examine closely, we shall differ with him more in words than in ideas. The main, the prominent feature in the pathology of HIPPOCRATES is a morbid state of the fluids, a sort of qualitative change of them — the main therapeutic principle as stated in his writings, is that Nature, or a certain force inherent in the system rids it by the emunctories, by what he calls crises — of these morbid materials, and thus restores it to health. This doctrine was the result of close observation. HIPPOCRATES saw disease in most of its forms. He watched it closely, but he did not interfere with it rashly — he saw it terminate in thousands of instances after the evacuations just al-

luded to ; and he attributed the cure to the evacuations. He did not reason, *post hoc ergo propter hoc*, until the relation of cause and effect between the evacuations and the cure was established by facts so numerous, that the mind was forced to admit it. Medicine cannot boast a more philosophic mind than that of the Coan Sage. Who doubts his doctrine at the present day? Who can gainsay his facts? Do we not all know, that diseases will get well of themselves without the aid of medicine? Do we not see that injurious impressions made on the system excite actions in it, which actions result in the riddance of the system from these injurious impressions? Illustrations crowd upon us. The irritant, which is swallowed by accident or otherwise, excites vomiting, by which it is cast off. Over-exercise leads to fatigue, and fatigue to rest, which repairs the injurious effects of over-exercise. A fever makes the patient take the recumbent posture, and inspires him with thirst — and rest and cold water are amongst the essential remedies in fever. In Magendie's experiments it was observed, that putrid substances, injected into the veins of animals, caused in them a sort of fever with critical evacuations, which were followed by a restoration to health. The doctrines of Hippocrates we all believe or ought to believe. If we observe and reason, we are obliged to believe them — and let it not be said of his theory, that it leads to inertness in practice. It leads to the proper practice, if it be the true theory. "A masterly inactivity," so far as the administration of drugs is concerned, is often the best evidence of medical skill. To know

when not to act is as precious a piece of knowledge as to know when and how to act. Indeed, a knowledge of one is a knowledge of both. But the doctrine of HIPPOCRATES does not tend to make physicians mere lookers-on in the sick-chamber, or to be mere "meditators on death." It teaches, that the physician is the minister, and not the tyrant of nature — that he may aid her, when her actions are too feeble — that he may repress her ardor, and that he may change her direction. What intelligent physician pretends that he can directly cure a typhoid fever? What physician pretends that by bloodletting, or any specific, he can remove the cause and bring the system to a state of health? And yet all admit that the physician can do something — can be of some service. Yea, of great service. Every body, that thinks and observes, knows that the human system is so beneficently constituted, that it can act as its own doctor in many, we might say, in the majority of cases. Every physician knows, that a majority of cases, say of typhoid fever, will pass through all their stages safely, and terminate in health without the doctor's aid. This does not prove, that a physician might not have been serviceable; it only proves, that Nature can cure disease, or what means precisely the same thing, that diseases get well of themselves. But every one knows also, that in many cases there is a depression of the system, which cannot rise to re-action without certain aids, which the physician can employ. Here he can be of great service in supporting Nature. It is equally well known, that in many cases local determinations or inflammations super-

vene, and that these can be obviated or relieved by an appropriate treatment. We cannot, of course, in this brief notice, be very minute in the exposition of any individual theory; but we venture to say, that the theory of Hippocrates embraces all that is best in the modern theories of fever, both as regards their pathology and therapeutics. He does not use the words synocha, synochus and typhus, but he describes the things and the true modes of their treatment.

Did Hippocrates then establish a true and complete theory of medicine? Did medicine, like Minerva, spring perfect from the brain of this Jupiter of the Divine art? we would not say so, far from it; but this may be safely asserted, viz: that Hippocrates saw the truth and described it — but at the same time, it might be said that he did not see the whole truth, or, that if he did, he gave undue prominence to some truths over others. He seems to have looked at only a morbid — a sort of poisoned condition of the fluids and the modes and periods of the elimination of morbid materials from the blood. We would not say, that Hippocrates did not recognize other elements of disease; but, that morbid humors appear to constitute his whole pathology. It is true that this state, or rather these states of the humors do constitute a vast portion of the domain of pathology — but are there not diseases in which the fluids are not poisoned, in which they are healthy or but slightly altered are not mere states, as congestion of the blood, without any poison in it, capable of causing great derangements in the functions of the system? It appears, that Hippo-

CRATES did not estimate changes in the equilibrium of the blood. He devoted his attention, mainly, to its qualitative changes; and it seems, that as far as he went he was right. Two thousand four hundred years have passed by, and his theory stands as firm as ever. Truth is immortal; it will be just as firm and immovable two thousand years hence. It does not appear, that HIPPOCRATES had a right view of inflammation — of those diseases, which consist rather in determinations than deteriorations of the fluids. His view seems to have been partial; but he saw and recorded a vast portion of the truths of medicine.

Let us pass to others of great lights, tnat gild the skies of medical philosophy. Let us look at THEMISON, the founder of what has been called the Methodic sect. He considered diseases as consisting in certain states of the system. So far so good. They are certain states of the system; but he restricted them to relaxation, constriction, and a mixture of these two — or a laxum, strictum, and mixtum. It has been objected to this view, that, though we can understand well enough what relaxation and what constriction are, we cannot well conceive of a diseased state intermediate, or the mixtum. It is true, that in one point of view this mixtum would be a state of health — a state, in which the relaxation and constriction are equally balanced; but this may not be what THEMISON meant. He may have meant that condition of the system, in which one part is in a state of constriction and another part in a state of relaxation. This is *solidism*; for constriction, and relaxation are states of the

solids; but this solidism is not in opposition of the fluidism of Hippocrates. The doctrines certainly do not exclude each other; they are not the same doctrines, far from it; but they are not contradictory doctrines. The doctrine of Hippocrates embraces one portion of pathological truth. The doctrine of Themison another — a less important part, doubtless. All of us believe in the doctrine of Themison; we are all aware that a constriction of the vessels of the surface, caused by cold or by mechanical means, will interfere with the circulation, and will cause congestion in the interior. All of us believe in a relaxed state of the vessels causing states of the blood in them, and we endeavor, as did the Methodists, to relieve this state by astringents, as we do also to relieve the state of constriction, say of the surface, by the relaxant effects of the warm bath. Hippocrates seems to have confined his attention merely to the blood and humors — the things contained; Themison to the parts containing — the vessels, the solids; but this solidism and fluidism are evidently harmonious and not contradictory doctrines. Both are partial doctrines.

Galen, who ruled the empire of medicine a thousand years, taught, and somewhat enlarged upon, the doctrines of Hippocrates — the four elements, the four humors, the four qualities, play a conspicuous part in his writings. There can scarcely be a doubt that Galen also believed, as did Celius Aurelianus, and Celsus, in the doctrines of Themison; but he did not allot that importance to them which they deserved. All, who think, (and medicine can boast of no greater mind than Galen's,)

must believe in both. We pass over Oribasius, Aetius, Paulus Eginetus, sucesssors of Galen. We make the long, though not laborious flight of more than a thousand years, to arrive at the confines of the authority of the great Roman. We cannot, however, in our transit on the "cloudy wings" of ages, viewing, as we go, the decline and overthrow of the world's fourth, and, perhaps, last universal monarchy — the fall of Rome's triumphant eagles, "pierced by the shafts of banded nations through,"—"the rushing millions," which the barbarous north poured from her frozen loins to devastate the fair garden of Italy, as devouring locusts, "and spread beneath Gibraltar to the Lybian sands;" we cannot, as pass by us Attilla, Genseric, Goth, Vandal, and Tartar, smeared with blood and glittering in the light of flaming cities; and, as over the awful spectacle closes the night of ages — as we behold the rising stars of new empires — phœnixes from the ashes of the past — a new world and a new civilization — we cannot, as we see all this and more, and remember that Galen's fame and authority lived through it all and survived it all, fail to admire him far above the Syllas and Pompeys, Cæsars and conquerers, and to rank the efforts of intellect and genius far above the brute force of battle fields; we cannot help feeling proud that Galen was our medical brother.

We have arrived at the commencement of the fourteenth century; Mondini is dissecting in Bologna, Gilbert is writing a medical treatise in England. Chemistry is cultivated, printing is discovered; we pause to notice for a moment the chemical and mechanical or

iatro-mathematical sects on medicine. It was the opinion of many that chemistry explains a great many of the phenomena of health and disease. The doctrine of fermentation and acids and alkalis hold a conspicuous place in the systems of Sylvius, of Willis and others. They may have pushed the doctrine too far, but all admit and know that chemistry does explain a great many of the phenomena of health and disease. All admit that it explains more of these phenomena now than it did in the days of Sylvius, and that it will, in the future, throw additional light on the mysteries of life and disease, in proportion as it advances in the discovery of truth. Similar remarks may be made of the mathematical or mechanical doctrines. That mechanical laws explain a great many of the functions of the system, none will deny; we see in it levers of all the various kinds — the laws of hydraulics explain, in part, the circulation of the blood. Mechanical obstructions evidently produce disease. Thus are produced the congestions and dropies, the result of heart diseases. We should be more disposed to feel grateful to Borelli, Bellini and other coworkers of these sects, than severely to criticise them.

We speak in one sentence of Sydenham and Bœrhaave, the greatest names since the days of Hippocrates and Galen. Both of them were Hippocrateans — we do not assert that they agreed in every particular, either with each other, or with their venerable predecessors of Greece and Rome, but they — all four, Hippocrates, Galen, Sydenham and Bœrhaave agreed in the main. Boerhaave has been called the Batavian Hippocrates.

Sydenham the English Hippocrates. Of the Archeus of Van Helmont it is sufficient to say, that it answers to the Phusis or Nature of Hippocrates. The same may be said of Anima Medica of Stahl and Hoffman. They meant merely a power which regulates the system in health and tends to rid it of disease. Hippocrates called this power Phusis; they called it by a different name. The spasm and atony, which play so important a part in the pathology of Hoffman, answer to the striction and laxum of Themison. If there be a difference, it is very slight. We noticed that Themison was a *solidist;* as also of course was Hoffman, that is to say, that the states of the solids in disease attracted their attention more than those of the fluids. The former stand out in a bolder relief than the latter, in their systems; but it would be an error to suppose they did not also believe in diseased states of the fluids. The cultivation of anatomy, healthy and morbid, seems to have contributed to the rise of solidism and the decline of humoralism — anatomy deals only with the solids — the solids were found to be diseased in the majority of cases; on post mortem examination — the states of the fluids were not so easily estimated — the morbid states of them eluded observation. Hence the fact that solidism became the dominant doctrine, and fluidism fell into disrepute, and we even now see the words "*exploded doctrines of the humoralists*," in many of our medical works. But humoralism has never been, and never will be exploded, as long as the blood nourishes the tissues. Nor will solidism be exploded, either, as long as the tissues continue to undergo alterations from changes in the blood.

The doctrines of Cullen are so nearly those of Hoffman as to render any notice of them here unnecessary. Of Brown's theory it is sufficient to remark, that though *simple over-action and under-action* frequently attend disease, they constitute but a portion, and rather a small portion, of the domain of pathology, and consequently, that though the lancet and brandy bottle are good in their places, they do not constitute the entire magazine of therapeutics.

The system of our immortal countryman, Rush, was somewhat peculiar. He considered disease as a unit, that is always the same thing, differing in only its degree and its seat. Really there is much truth in this view. In what do cerebritis, gastritis, etc., differ, except in their seat? To these add the various differences of degree and complication, and we have the unity of essence and the multiform manifestations of disease, advocated by Rush. He did not attach so much importance to the curative powers of Nature, as did many, whose names we have mentioned. Disease, according to him, consists in the disordered and irregular efforts of debilitated Nature; and he was not much disposed to trust the system to this disordered and deranged Nature. He viewed disease as consisting merely in an excited state of the capillaries, which required rather bleeding and purging than mere "expectation." It is obvious that the attention of Rush was very much confined to inflammatory diseases. Inflammation is one of the most frequent of diseases. It constitutes a large class of itself, and also enters largely into the other classes. It may combine

any and all diseases. Rush's attention was mainly absorbed by this important pathological state. Now inflammation and inflammatory affections are those, above all others, which cannot be left to Nature; they demand the active interference of Art. Natures cures fevers — the physician cures inflammations. We do not mean by this assertion, that nature is useless in the one, and the physician powerless in the other, but, that the physician has far more power in the one than the other, and that Nature has more power in the one than the other, in the order mentioned. It was reasonable, then in Rush, to reject Nature, to a great degree, in the treatment of that class of diseases which mainly attracted his attention, namely the irritative and inflammatory, and it was reasonable in Hippocrates to trust to Nature in that class— the fevers — which mainly attracted his attention. Hippocrates dealt with the changed qualities of the blood, Rush with its changed quantities. Nearly akin to the views of Rush were those of Broussais, with which most physicians are familiar. Irritation seems to have been the whole of his pathology. What did he mean by irritation? Evidently but a degree of inflammation. He took into consideration little besides exalted physiological action the result of hyperemia, and that was to be remedied by v. s., gum arabic and starvation. There is no better treatment for uncomplicated inflammation than that proposed by Broussais — but then there are other pathological states, which do not require such treatment, but to which the illustrious Frenchman does not seem to to have devoted much attention. Irritation, like Aaron's

rod, swallowed all the rest of the elements of disease, and hid them from his view. We might go on to examine theories, without end, and yet we should find always that they contained the truth — the truth as far as they go. We might notice the theory of Billing, that health consists in the normal calibre of the vessels, and disease in the dilatation and contraction—a theory almost identical with, and leading to the same ratio medendi as that of Themison — of the theory of Cooke, which made congestion embrace almost the whole domain of pathology. But enough has been said to establish the position that the great minds, that have been devoted to medical studies, have not arrived at results so contradictory as has been often supposed. The theories of our fathers have been incomplete not false. They have prepared much of the materials from which their sons may construct the edifice of medical science. Our respect, nay, our admiration, is due to those giants of the profession, who accomplished so much for science and humanity, under circumstances so much less favorable to their high mission, than those by which we are at present surrounded. The world owes a debt of gratitude to those "mighty men of old."

As another cause of apparent discrepancy in medical doctrines, may be mentioned the disposition of authors to attribute to one another a narrower exclusiveness than they really profess. It is rare, in medical discussions or examinations of medical doctrines, to find the views of authors fairly stated and calmly analyzed. To find fault seems to be one of the instincts of man; and any thing

may be rendered worthy of being found fault with, by changing it a little — thus, if HIPPOCRATES teaches that the fluids are altered in disease, all the fault-finder has to do is to say that this is *humoralism* — exclusive humoralism — though the author may not be an exclusive humoralist — the objector can charge it to him and then of course confute him by showing that the solids are the seats of disease also — we can confute any author if allowed first to misrepresent him. If BROUSSAIS teaches that irritation is the main element of disease, and even goes too far with it, (as he doubtless has done) the fault-finder can attrbute to him the doctrine of exclusive irritation — can say that BROUSSAIS makes irritation every thing, and then he can prove that there is something else in disease, and thus confute BROUSSAIS. If LOUIS shows that ulcerations of the glands of peyer are observed, nearly always, in the continued fever of France, it is immediately asserted that LOUIS regards the ulcerations as the proximate cause of the fever. If COOKE proves that there is congestion of the vena cava and its branches in the incipiency of fevers, it is immediately declared that COOKE makes this congestion cover the whole ground of pathology. If Dr. B wishes to trim the wings of medical imagination a little, Dr. C declares that B is opposed to theorizing in medicine — opposed to thought even. And if Dr. C theorizes ever so logically — even draws a plain inference from well established facts, Dr. C accuses him of trusting more to *fancy* than to facts. The unfairness of medical writers is a fruitful cause of apparent discrepancy in medical theories. If they would endeavor to agree as much as

they seem often to endeavor to disagree, they would closely approximate in the great principles of medicine. We hope that we shall not be misunderstood — we have attempted to illustrate the proposition that the discrepancies of medical authors on the leading principles of pathology have been rather verbal than real — rather in appearance than in fact.

May we not hope from all the materials furnished by the labors of the past to lay the foundations at least of a complete medical theory? The materials may not yet be all of them in readiness for the building — doubtless many details are wanting, much has yet to be done, but the main portions are certainly considerably advanced. It may be laid down as established, that the pathological changes which are observed in the solids, as atrophy, hypertrophy, hardening, softening, tubercles, tumors, etc,. are all of them mere alterations of nutrition. This is universally admitted — indeed all the changes of the solids are denominated changes of nutrition. Now, it is admitted that the blood nourishes the solids, and that no alteration in their nutrition can take place in them, without previous change in the blood — when an atrophy takes place, it depends on a diminution in the quantity of the blood in the part — when hypertrophy, the reverse — when tubercles, the quality of the blood is changed — so that it may be safely asserted that the pathological changes of the solids depend on previous pathological changes in the fluids. What are these states of the fluids? We know that the blood is easily changed in its quantity and its equilibrium, which

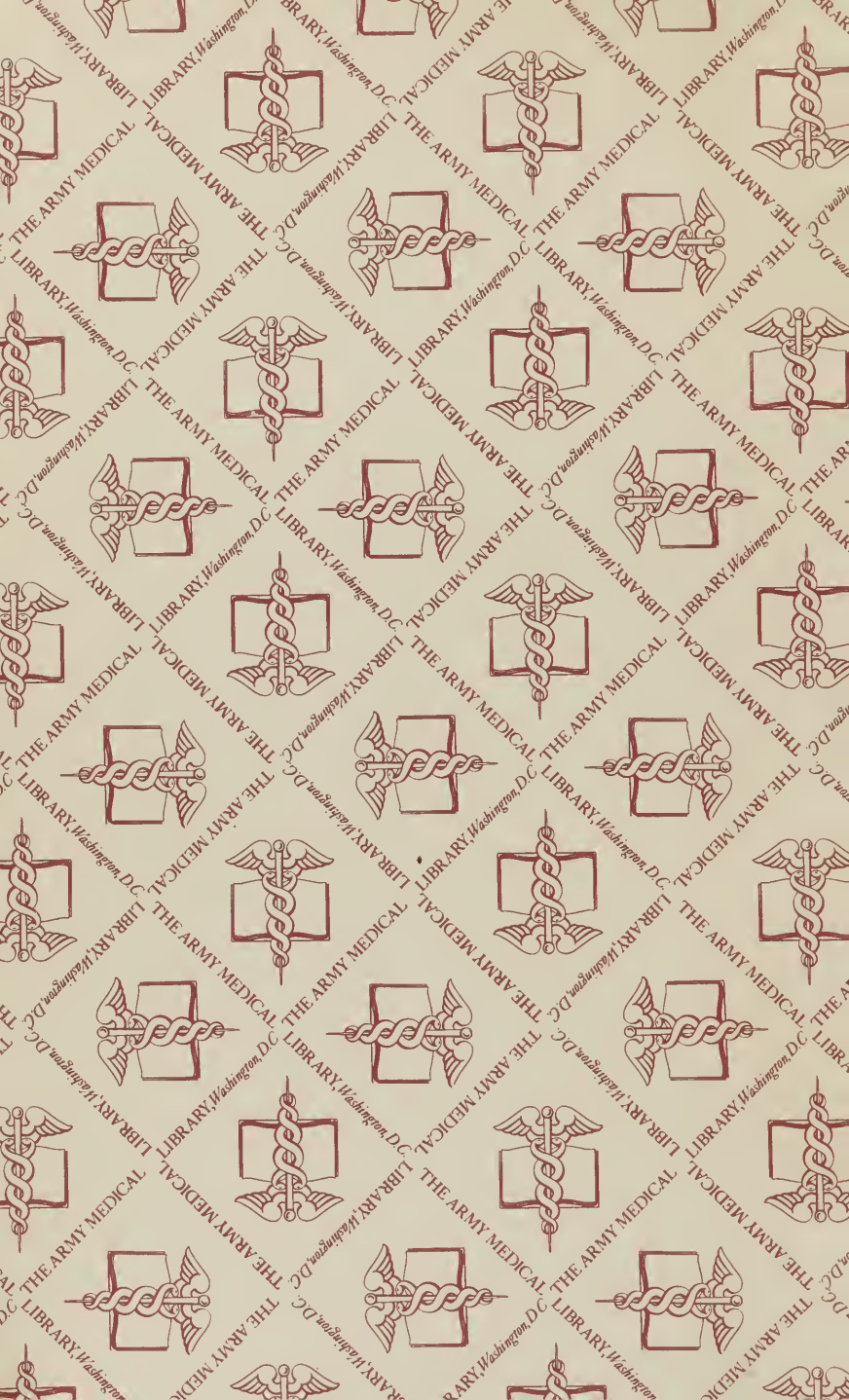
is but a change in its local quantities. We know that the quality of the blood is easily changed — we know, or have every reason to believe, that its qualities are changed by the causes of typhus fever and small-pox. Very well, the blood may and does become changed in quantity and quality. What changes should these cause in the solids? Of course some change in the quantity and quality of the solids, as increasing the bulk of the solids — hypertrophy, when it is simply in excess in the part—diminishing the size of the solid — atrophy, when it is simply deficient, and causing changes in the constituents and nature of the solid when its quality is deteriorated. In other words, we should reason *a priori* from our physiological data, that the changes of the blood, which we know do take place, would cause *increased*, *decreased* and *perverted* nutrition; and these are the states of the solids, which all pathological anatomist describe. They say, in so many words, that under the heads of *increased*, *decreased* and *perverted* nutrition, all pathological changes of the solids are embraced.

In the changes of the quality of the blood, we have the doctrine of Hippocrates; and in the doctrine of Broussais, and indeed, of all the moderns, we have changes of the quantity, as congestion, inflammation, etc. In the doctrine of Themison and others, we see those changes in the calibre of the vessels which we know co-exist with anemia and congestion. In the doctrine of the pathological anatomists, we find the changes in the solids. These various changes in the fluids and the solids cause the multiform changes in the actions of the organ and parts,

which by many have been classified as diseases, but which are but the symptoms of diseases.

The formula which we proposed in our first chapter, and which we have endeavored to prove and illustrate throughout this essay, would seem then to embrace all the elements of disease, and all the medical theories worthy of the name, viz: *Disease consists in certain changes in quality and quantity of the blood, and the alterations of the solids consequent thereon.* We propose it therefore as embracing, not only, the main elements of pathology, but the principal theories of the past. We have not time further to dwell on this very interesting subject. Our object will have been accomplished, if we have succeeded in showing that our fathers have reasoned, have theorized well; and that they were not the contradictory and absurd ignoramuses, which they have been sometimes, and by some persons, represented to be. We would be well satisfied if what we have said should inspire a greater confidence in medicine as a science. If all the theories of the past are but as a mass of contradiction—if system has followed system, each annihilating its predecessor, and in its turn meeting a similar fate — if each has been but the bubble of an hour — if the efforts of mind, in this department of knowledge, or rather research, have led to results which are so short-lived and transitory, the physician may well despair of arriving at truth, conclude that all is mere speculation and guess work, and beg to be excused from subjecting his brain to the "wear and tear" of study and thought on subjects, which have eluded and bewildered, for more than two thousand years, the

patient investigation of the best minds the world ever produced. We are satisfied that such is not the fact. Happy should we be if we could contribute somewhat to the advancement of medical science, by inspiring its cultivators with an increased confidence in the results of the labors of the past and a higher regard for the doctrines of "the fathers." The study of medicine has always rewarded its votaries with a rich harvest of truth; and therefore, we may expect to be benefited by our exertions — by our endeavors to arrive at something solid and unchanging and true, in our profession — whether we consult the immortal thoughts of the Past, or Nature's ever open book of the Present.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